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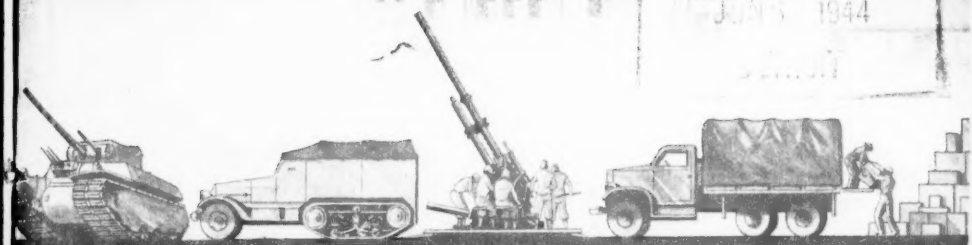

COMMAND AND GENERAL STAFF SCHOOL

FORT LEAVENWORTH, KANSAS

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COMMAND AND GENERAL STAFF SCHOOL

MILITARY REVIEW

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Plays in Preparation for Battle

MAJOR GENERAL ORLANDO WARD, *U. S. A.*
Commandant, Field Artillery School, Fort Sill, Oklahoma

FROM Epaminondas and Philip of Macedonia, Alexander the Great borrowed the idea that armies won on the battlefield by practice on the drill field. The maneuver of the phalanx, as designed by Alexander and his generals, was practiced intensively.

At Leuctra, in 371 BC, Epaminondas introduced a previously rehearsed phalanx, its left wing reinforced to a depth six times that of the rest of the formation. The Persians opposing him depended on a balanced line, victorious for a hundred years; their leaders recognized no need for change. Epaminondas met this traditional array, bucked his strong left wing over the line, utterly crushing the Persian right. His column then veered to the right piling up the Persian center and left wing, and sweeping them from the field. As far as in known, this was the first *practiced* battle *play*—what we might call a wing back—and it carried for a touchdown.

There has since been no justification for scrapping this 2,300-year-old idea of training soldiers during peacetime in the exact techniques and maneuvers on which they rely in war. At Fort Duquesne, Braddock's failure to train his British regulars for the New World battlegrounds invited a thrashing at the hands of the French and Indians. To mass their fire, the British stood erect, in the open, formed in close ranks, and discharged practiced volleys on command. Their enemies, flouting battle etiquette, dispersed and enjoyed all possible concealment. Thrown into confusion by these unorthodox, invisible targets, the British were slaughtered and routed. In the final analysis, this was not a victory of French and Indians over an army of British —it proved a defeat for the close order formation and a vindication of Alexander's idea of realism in prebattle scrimmage and drill.

Instead of being laid to rest alongside its kin, the musket and short bow, somehow the close order formation was exhumed again and again: Pickett's charge, the slaughter of Cold Harbor, the French Revolution, some battles of the Boer War, and many more paragraphs in the history book, written as fresh text, with new casts, new scenery, and up-to-date motives, were fought as trite revivals of that old formation.

When many of us became cadets at West Point in the 1900's, close order drill was employed chiefly to induce discipline. Battle practice, however, as skirmishers and foragers, was still an event instead of a habit. About the same time, football was coming of age, along with baseball, hockey, and other organized contests. Football particularly involved enormous stakes in the form of gate receipts. It was competition, played by experts, coached by experts, in which the players periodically huddled behind the line, discussed briefly what was to be done, and then strived energetically and concertedly to carry through the chosen maneuver exactly as it had been practiced.

What about the stakes of battle? Although there started to appear rehearsals of contemplated attacks, in World War I there was little battle drill, battle practice, or expert preparation for the life and death struggle the infantryman was to wage under rolling barrages and in advances covered by machine-gun fire.

No practice was had in achieving order out of the confusion of battle. Units always trained as if full strength or three-quarters strength. Maneuvers terminated punctually before attacks were thrust home and the situation could be exploited advantageously or otherwise. Military "language" had progressively become more obtuse to the citizen obliged to carry the brunt of a nation in arms. More precious time was required to teach him what was meant by enveloping the right flank than to train him for its accomplishment. Abbreviations became the vogue. The five-paragraph order, admittedly a good check list and stage setter for combat, had become its very essence. The language defied translation by the civilian without resort to the latest glossary of terms and ab-

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breviations. Moreover, once the order was issued, a feeling of satisfied relief invaded, and usually captured, the command post. The follow-through was too often forgotten.

When we joined World War II, we found that the advantage of a common language had been largely jettisoned by the outcropping of abbreviations and terms unfamiliar to the ordinary Englishman and American. Had we inadvertently created a military tower of Babel?

Meanwhile football had developed scientifically. A winning coach demanded higher monetary reward than the Chief of Staff of the Army. The football mentor drilled his men in formations and plays which they might need in competition; a quarterback, confronted with defensive or offensive crises, could make an estimate of the situation and, in the huddle, call for a play which his team had practiced and which they might reasonably be expected to carry through to completion. The football huddle is not a get-together to issue a five-paragraph order; it is a simple, speedy, secret means of setting off the next play.

When all is said and done, what is war if not a "big" game on a field which is forever changing, played by men and, to a great extent, dominated by destiny? But do we want to leave it all to luck? Don't we want to push destiny a little in our direction?

Our teachings have resulted in advocating reconnaissance which is seldom accomplished; in advocating an estimate of the situation which lack of time frequently precludes; and then in the issuance of a five-paragraph order to be executed on a strange game board with little practice, by men still stunned by its ineloquence.

What football coach who wanted to keep his job would send his linesmen and backs into a big game without having first scouted the opposition and held skull drills, aided by motion pictures of both teams; without scrimmaging and drilling for perfection with signals and plays which not only the quarterback and center but which every third-string scrub thoroughly understands? Nor does the football coach require his quarterbacks to improvise in the heat of play. An outstanding team captain or quarterback may be allowed some leeway for the exercise of inspiration and ingenuity; but his coach expects him to utilize such ingenuity and inspiration in selecting sound plays and formations *already rehearsed*, not in dreaming up hasty concoctions.

In the heat of battle few men are blessed with inspiration. Few have a God-given insight, especially when the going is tough. On the other hand, with familiar combat plays and combat language, our quarterbacks, whether squad leaders or major generals, could react promptly to the efforts of the enemy. Above all we could expect the intelligent participation of enlisted men and noncommissioned officers.

In the football huddle, there is no talk of enveloping the left. Let our military terminology too be simple and calculated to reach the understanding of our type of citizen: wing backs and mouse traps, end runs and right hooks, if need be.

Leadership starts on the drill field. The higher the commander the more influence he must exert on his men in training. We as leaders must devise a bagful of plays and formations; we must exercise these plays on our practice fields precisely as we plan to employ them in battle; we must teach and call signals in the vocabulary of our soldiers. Are these wars not more important than football?

The more mechanical become the weapons with which we fight, the less mechanical must be the spirit which controls them.

—Major General J. F. C. Fuller

Third U. S. Infantry Division in Italy

LIEUTENANT COLONEL JOE E. GOLDEN, *General Staff Corps*

Lieutenant Colonel Golden spent approximately two and a half months in Italy (6 October—23 December 1943). Most of this period was spent with the Third U. S. Infantry Division from the time it crossed the Volturno River until it breached the German's "winter line" at Mt. Rotundo.—THE EDITOR.

WHEN one visits the Third Division command post, the first sign he sees after entering the CP is an arrow pointing to the War Room.

The War Room is a nerve center of the operational activities for the entire division. It is the place where the Commanding General of the division and his staff actually control and direct the operations of the fighting units. Here the Division Commander comes to study the current tactical situation. Here is where he picks up the telephone and calls his regimental and battalion commanders, questions them regarding their respective situation, and issues orders for the fight. Practically all orders are verbally given. Paper work in this connection is cut to a minimum.

The War Room ordinarily consists of a large storage tent with a smaller command tent attached at one end. Overall, a large camouflage net hides the War Room and the approaches thereto from enemy observation. Inside of the larger storage tent are several knockdown tables, a dozen chairs, four or five telephones, numerous map boards, and charts. The two most prominent map boards are marked G-2 and G-3.

Maps and Records.—The G-3 map shows the current dispositions of the tactical troops of the Third Division and those divisions on the right and left, together with the future plans of action of the division.

The G-2 map provides up-to-the-minute data and information of enemy dispositions together with the battle order and the known locations of his artillery and other weapons. The G-2 also keeps in the War Room photo mosaics of the terrain, as much as ten to twenty-five miles deep into the enemy territory, in the Third Division sector. Here also is a road map kept by the Division Engineer, whereon we find the current information regarding the condition of all roads and bridges within the division zone of action, and the extent to which they have been searched for mines and improved.

The G-4 also keeps a situation map in the War Room whereon at a glance one can see the supply routes, supply points, and the disposition of the service elements, where the evacuation hospital is located, or where one must go to enjoy the facilities of the division shower units.

The G-1 keeps a board whereon is presented the current data with respect to the strength of the division. Here we find accurate figures regarding the strengths of each unit, the number of men sick in hospital, the number missing in action, and the effective fighting strength of the division itself. Daily records are posted here regarding each day's casualties. These casualties are broken down to show the number of men killed in action, the number of men wounded in action, the number of men missing in action, the number of men injured by accident, and the number of men sick.

These records also reveal the causes of the casualties (i.e., small-arms fire, shell fire, or nature of accident or illness). This is all tabulated in concise form so that any information desired in this regard can be obtained at a moment's notice. Also is shown the number of men being returned to duty from the hospital together with the number of replacements received from day to day.

By means of this information, the Commanding General may quickly tell the status of the effective fighting strength of his division and the reasons for any variation in its effective fighting strength from day to day. He is thereby better enabled to determine the capabilities of his forces.

Personnel and Staff Duties.—The personnel of the War Room varies from day to day. Usually it consists of at least one officer from the G-2 Section, one officer from the

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G-3 Section, the Artillery Liaison Officer, several shorthand experts, and a chief clerk who keeps the G-3 map up-to-date and at the same time is responsible for taking the necessary action on any G-3 calls which may come into the War Room. The G-2 officer keeps the G-2 office map posted and up-to-date and evaluates and disseminates to the proper agencies, spot G-2 information as it is received. G-2 and G-3 periodic reports are closed as of twelve noon daily. Within the division itself, they are distributed down to and including battalions. However, spot G-2 and G-3 information is disseminated promptly by telephone to the persons concerned.

Each morning, a representative of the G-2 Section goes to the War Room, checks with regimental S-2's for the latest enemy information, particularly night patrol reports, and makes a telephone report to higher quarters. A short time later, the night duty officer is relieved and the G-3 begins to check up on the troop operations of the day. Calls are made to all the regimental commanders and, in many cases, directly to the battalion commanders, to make certain that they know exactly what is expected of them, and to see whether they know what the units on the right and left are called upon to do. From that time on until late at night telephone calls are made at periodic intervals to check on the progress of the front-line battalions. Finally, at the end of the day, late at night, the last check is made to see if all units are secure for the night, that patrols have gone out as planned, that contact is being maintained on their flanks, that they know the exact disposition of the troops on their flanks, and whether or not their supplies are coming up in proper order. Frequently, when the battle is intense or when plans are being made for a big push, the War Room operates at full speed throughout the night.

All incoming tactical telephone calls are directed through the division switchboard to one of the telephones at the War Room. Here an officer from G-2 or G-3, each of which is on duty throughout the day and night, answers the call and obtains the information desired. If any call involves the movement of our own or enemy forces, or provides new information or information additional to that presently on hand, it is immediately posted on the appropriate War Room maps. All conversation is recorded verbatim by three shorthand experts. Later, this information is typed, reviewed, and recorded as part of the daily G-2—G-3 tactical journal and becomes a part of the historical records of the division. This system eliminates any possibility of confusion regarding decisions and instructions which have been given by word of mouth. There is no comeback on orders issued. Further, all that the Commander or anyone else has to do in order to bring himself up-to-date on the current situation, is to study the journal in conjunction with the G-2—G-3 situation maps.

Also in the War Room is a direct telephone line to the division artillery. This has one particular advantage, in that any incoming telephone calls which provide any information regarding enemy targets suitable for our artillery can be immediately telephoned to the artillery and fire can be brought to bear most expeditiously. There are no interfering calls to delay the message.

Artillery Liaison Officer.—The War Room Artillery Liaison Officer advises the Commanding General and staff on artillery matters, and keeps up-to-minute data on known enemy artillery locations, the time, place, and number of concentrations fired, and the counterbattery fires received from the enemy.

The G-2 of the Third Division frequently used the artillery Cub planes for intelligence purposes, i.e., locating enemy front lines and enemy gun positions. They proved invaluable in this respect. However, they were also called upon for other miscellaneous duties as well as spot artillery fire.

For example, in one particular instance, a unit of the Third Division had fought its way up a steep, rocky slope of a 3,000-foot mountain and had pushed its way over the crest and taken up a position on the north slopes. Reconnaissance troops had endeavored to locate this particular unit without success and

the battalion commander had reported that food, water, and ammunition would soon be exhausted. In the meantime, the G-4 had started a mule pack train up the mountain with these supplies and it too was apparently lost. The Chief of Staff then called upon division artillery to send a Cub plane out to locate both our front-line troops and our supply train, with instructions to drop a note to the supply train worded about as follows: "Follow my line of flight to the Second Battalion." The Cub plane went out on its mission, located both our front-line battalion and the pack train, dropped its message, and returned, reporting that it had completed its mission. Later, word came to the War Room that the supplies had arrived in the nick of time. One officer said, "We were just getting ready to fire our last few rounds of ammunition when up came the pack train, and boy, were we glad to see them!"

Air Liaison Officer.—An Air Liaison Officer is on duty at the Third Division CP at all times. He is utilized in planning for requests for the daily air missions. These requests were made generally the day before the missions were to be flown. They included not only combat missions but reconnaissance and photographic missions as well.

G-2, Third Division, calls upon the air force constantly for aerial photographs. Within the War Room itself, he keeps a photo mosaic of the entire division front to a depth of ten to twenty-five miles within the enemy territory. These photo mosaics prove to be invaluable for planning purposes, and for patrol briefing. Further, the photo interpretation is frequently able to determine probable enemy targets for our own artillery, such as enemy artillery positions, command posts, observation posts, and other positions.

War Room Displacement.—When the CP displaces forward, the War Room tent is the first tent in the CP to be moved. As soon as it is set up and ready for operation, the General, with certain staff officers, goes forward also. In the meantime, while the War Room is actually in movement, the G-3 tent serves as the "Little War Room." One particular advantage in having a representative of G-3 and G-2 in the War Room at all times, together with their respective situation maps, is this: G-3 is kept familiarized with all the current G-2 information. Similarly, G-2 is also familiar with our own current troop dispositions. Each can see the other's situation at a glance. Staff liaison between these two officers is thereby greatly simplified.

Traffic Control

Within the Third Division area, control over all traffic is exercised through the Provost Marshal of the Third Division. Within each regimental area in the Third Division, traffic control is the responsibility of the regimental commander. Each regiment has its own traffic control section of approximately twenty men. No unit in the Third Division is authorized to use roads without first obtaining a clearance from the Division Headquarters, G-3 Section. Within the G-3 Section of the Third Division is a Troop Movement Section. This section, composed of one officer and one clerk, prepares march tables and assists in the preparation of movement orders for the movement of all units in the division. It furnishes the Provost Marshal daily complete data and time tables on all units which will move over roads within the Third Division sector. The Provost Marshal then controls the movement of these units accordingly.

Traffic control posts are established at principal road junctions and road crossings in the Third Division sector. These traffic control posts are connected by telephone to Division Headquarters and report regularly to the Provost Marshal and/or Troop Movement Section, when each unit arrives at and clears the traffic control posts.

As the Germans already well know, in some instances, back in the rear areas particularly in the vicinity of bridges, there exists a tendency to close up vehicles, bumper to bumper. Sometimes traffic is jammed together in this manner for a long while, thereby offering good targets for aircraft. Fortunately, most of the time we have exercised air superiority. On one or two occasions, such jammed up columns were strafed, resulting in a few vehicle losses and some casualties.

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At night, it was often noted that traffic was jammed in this manner. However, it has been pointed out that at night the confusion which might have resulted in convoys becoming lost and separated was thereby avoided, whereas the prospects of an enemy air attack on the roads at night were slight.

Morale

Despite severe weather conditions and long periods at the front, morale of the front-line troops remains excellent. As a matter of fact, it seems that the closer to the front our troops are, the higher the morale. Some of the means by which the Third Division keeps its morale high are as follows:

Baths and shower units are made available to units whenever possible. Usually these are available when a battalion or regiment is pulled out of the front line for replacement. Mail is delivered with rations to front-line units and, in general, the service is very satisfactory. Daily news sheets and bulletins and the *Stars and Stripes* are distributed to the front as far as possible, in order to keep the men informed of current events and developments both on the war front and at home. Of course, other factors enter into the picture such as regular delivery of rations, water, and ammunition to the front and the satisfaction of giving the Boche a good licking. It is very noticeable also that the appearance of doughnut girls in any area, and the provision of entertainment in the form of camp shows to units in rest areas, boost morale greatly. At one time, even during combat, a few selected men per company were granted five-day leaves to visit a rest camp in the rear, where complete rest and relaxation were available. Every possible comfort was provided—music, shows, dances, trips to points of historical and educational interest, Pompeii and Mt. Vesuvius, and guides to art exhibits and museums. This feature was hailed a great morale-building factor by all commanders.

Training

Training during rest periods also included instruction and discussion periods on topics such as "Why We Fight." The purpose of these periods is to stimulate the men's minds with a view to giving them a clearer concept of the war. These periods were greatly enjoyed by the men of the division.

It is interesting to note that when the Third Division was pulled out of the line for a rest period, the Division Commander immediately commenced planning for the proper training of the replacements which he was receiving. Of particular importance are scouting and patroling, weapon handling, tactics of small units, and discipline. This division conducted a most extensive training program on the above subjects and included also a battle course using supporting arms (tank destroyers and artillery), overhead fire, and live ammunition. All men were given training in mines and booby traps, which the Germans use extensively. Frequently our infantrymen, in the attack, have to detect and clear enemy mine fields in the areas in which they are operating. It has been found that the assurance gained from knowing how to detect and how to render safe enemy mines and booby traps enables them to proceed more rapidly through mined and booby-trapped areas.

Pack Animals

In the difficult mountainous terrain, such as is encountered in Italy, the need for animals for packing weapons and supplies becomes more and more apparent. The Division Commander is a man who attacks every problem vigorously, both tactical and technical. When the need for these animals became apparent, he promptly organized his own pack trains and by improvising where necessary he evolved an efficient organization for packing artillery, ammunition, food, water, and other supplies to his men in otherwise inaccessible localities. This mounted organization was later adopted in other divisions, who quickly recognized its worth.

In some instances, the Division Commander improved mule trails to a point where they could be used by jeeps. He organized a unit referred to in the division as "jeep artillery," using light airborne howitzers towed by jeeps to support the infantry in some mountainous areas. Jeeps with trailers hauled in supplies. In still another instance, he used his animals

to make a pack chemical warfare battalion. How was he able to do this? By requiring his G-4 to exercise close control over all animals as well as vehicles within his division.

PW Interrogation Teams

Prisoners of war constitute a valuable source of information, providing they are inclined to talk. The Third Division utilizes this source of information. Each regiment has a prisoner-of-war interrogation team at its regimental headquarters. This team consists of one officer and one enlisted man. Still another interrogation team is at the division prisoner-of-war enclosure. These teams submit their reports directly to G-2 division each morning. These reports are then consolidated and copies or extracts included in the G-2 daily periodic report.

Transportation of supplies and equipment in Italian mountains where motor vehicles are not practicable. (Signal Corps photo).

Miscellaneous

Training with Tanks and Tank Destroyers.—In the division, the maximum effort was made to exploit tanks and tank destroyers, but the limitations of these units were also recognized. Division and regimental commanders should be afforded during training the opportunity of operating with tanks and tank destroyers attached to their units, in order that they may have a more thorough understanding of their tactics and capabilities. It is well known in Italy that, for the most part, the terrain is unsuitable for extensive use of armored units. Further, when these units are attached to infantry regiments, it is found that frequently they cannot keep abreast of the infantry. As a result, it is extremely difficult to use armor to exploit fully advances made by the infantry.

Artillery Training for Infantry Officers.—The efficient division artillery fire control center is flexible enough to enable the Division Commander to shift his fire concentrations quickly and accurately to almost any portion of the division front. The General and his staff all feel that infantry commanders, even down to and including platoon leaders, ought to understand fully the use and capabilities of artillery fire in order that they may know when they can call upon artillery fire for support and when it is safe for our own artillery to fire. In some instances, Third Division infantry officers have called for artillery fire support and have actually controlled the artillery fire by calling the War Room and talking with the Artillery Liaison Officer, who in turn relayed the message to the division artillery directly. I have seen this happen several times. The division G-3 is of the opinion that a brief artillery observer's course would prove extremely helpful to infantry officers in command of troops in combat.

In one instance, the advance of one of our companies was held up high in the mountainous terrain. Our men were pinned down by German mortar and small-arms fire. The German troops, although only about two hundred yards away, were located on a rocky formation high above our own troops. Between our infantry company and the enemy was a gorge several hundred feet deep with steep, precipitous sides. The terrain afforded only limited cover. The company commander was reluctant to call for artillery support for fear our shells might land on his troops. He telephoned his battalion commander and explained the situation. The battalion commander, being a competent and aggressive leader, replied, "I'm coming up myself." After a long and difficult climb up the mountain side, he arrived at the company command post and made a quick survey of the situation, grabbed the telephone and called the Artillery Liasion Officer, and in a few minutes time our own artillery had silenced the enemy fire. In the meantime, however, this very valuable battalion commander was wounded and had to be evacuated to the rear. It is apparent that if our infantry officers knew more about the capabilities of artillery fire, they could make more use of artillery fire support. Perhaps division G-3's can devise some system within their divisions for affording infantry officers an opportunity to learn more of the employment of their own artillery fire. This is *most* important.

Corps Headquarters laid particular stress on the importance of reporting enemy artillery fire. It seems that although the lower units were often shelled, they seemed to take it for granted that everybody knew of the enemy fire. Frequently units were shelled without the knowledge of higher headquarters. It is important to emphasize to all the units down to and including squads, that enemy artillery fire should be reported immediately to the next higher headquarters. In many instances, counterbattery fire can be brought on the enemy batteries and their fire will cease.

Scouting and Patrolling.—The importance of scouting and patrolling cannot be overemphasized. It was found that the impulse for strong, aggressive patrolling, particularly at night, must come from Division Headquarters. Patrol missions should be assigned sufficient time to make daylight reconnaissance in the terrain over which the patrols are to move after darkness. It has been found further that a great deal of emphasis must be given to the proper *briefing* of the patrol before it starts out on its mission, i.e., making certain that each patrol leader knows exactly what his mission is, his route of march, and the details connected with his mission. At times, even the division G-2 himself briefed the patrol leaders of the division reconnaissance troop on several particularly important patrol missions. For this purpose, it was found that an aerial photo mosaic of the division sector was most valuable for clearly outlining and defining the patrol routes of march and missions assigned.

Continual attention must be given to training in scouting and patrolling. In mountainous terrains, such as found in Italy, it has been found that horse-mounted reconnaissance troops are most valuable for operating over the rough and difficult terrain. Animals make possible rapid movement over the many mule trails which are found in Italy. Animals also proved useful in supplying distant outposts which were accessible only on horseback or on foot.

Horses and mules needed to organize these mounted troop organizations were obtained through local purchase in Italy. Pack saddles and equipment were either obtained from the Italian Army stocks, local purchase, or by improvisation.

Reports.—In regard to reports, not only of patrols, but also of observation posts and front-line battalions, continual stress must be laid on giving *complete* information, i.e., *what, when,* and *where.* In the War Room, these three words are printed in bold letters on the map board directly above the telephone, as a constant reminder to the persons who answer the telephone calls that these three essential elements must be given in any report. Despite these measures, it is still found that there are times when incomplete messages are received.

Transportation for an Infantry Division, Motorized

LIEUTENANT COLONEL CHARLES S. COBB, JR., *Quartermaster Corps*
Instructor, Command and General Staff School

WE no longer have motorized divisions as a special type of organization. However, their elimination was not made because the usefulness of a highly mobile division has passed. Under circumstances favorable to their use such divisions will be indispensable in taking full advantage of the situation.

It has become apparent, however, that to organize particular units permanently with sufficient motor transportation to move all elements simultaneously is neither economical of equipment nor can this practice fully meet the need for such units when this need arises. We cannot afford to set aside a large number of infantry divisions for motorized operations only. Nor can we afford, in overseas theaters particularly, to tie up a large amount of motor transportation in such a way that it can not be used for other purposes when idle in its primary mission.

As far as transportation was concerned, the basic difference between the infantry division and its motorized twin was the provision in the latter of sufficient trucks and operating personnel to mount the infantry soldiers ordinarily expected to march on foot. A few other units, such as the medical battalion, engineer battalion, and division headquarters company, were also furnished a few more vehicles in the motorized division. Otherwise, as to transportation, the organization and equipment of the two types of divisions were essentially the same. Tactical employment of the two divisions varied only in detail, because when actually called upon to fight, the motorized infantryman was forced to rid himself of his truck, putting himself in the same position as the doughboy who walked to battle instead of riding.

It was decided, therefore, to organize this additional transport separately into a detachable, or attachable, unit which could provide mobility when it was wanted, and take it away when it was not wanted. So when the motorized divisions were reduced, a corresponding number of units were organized in which to pool the withdrawn transportation. These transport units were designated as Quartermaster Troop Transport Battalions.

The internal organization of these battalions was based on the existing tables for quartermaster truck units, since those tables had proved satisfactory for the operation of pooled motor transport. Actually, there is no difference whatever between a truck battalion and a troop transport battalion, either in personnel or equipment. Except for the fact that a "troop transport" battalion is expected to specialize in its training on cooperation with an infantry division, the results obtainable with the truck battalion are identical, assuming that the truck battalion would have a sufficient number of truck companies to do the job.

An understanding of the organization of the troop transport battalion is important because the problem of its integration with an infantry division is essentially one of blending the two units with the least possible disruption to either. This battalion is composed of a headquarters, headquarters detachment, and six troop transport companies. The battalion provides for general use 288 two-and-one-half-ton cargo trucks, each with a one-ton trailer. Its strength in personnel is thirty-six officers and 681 men.

Within a troop transport, or truck company, we find a squad, section, and platoon organization for effective control. Each squad operates four trucks and trailers. Two squads form a section; two sections are in each platoon. Three platoons and a headquarters section complete the company.

The amount of transportation in the troop transport battalion was necessarily based on the needs of the infantry division. In order to provide sufficient transportation to permit simultaneous movement of all elements, it was determined that each infantry regiment would need ninety-six trucks, or six standard-size truck companies for the division. This number allows for a few spare vehicles, and permits battalions at least, and perhaps companies, to remain intact without worrying about a

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few unused seats in the last trucks in each element.

It was realized that other units of the division also needed transportation for troops ordinarily required to march on foot. However, the motorization of all infantry soldiers eliminated the usual tactical demands on the transportation of the organic quartermaster company, permitting it to meet the needs of the smaller units of the division and at the same time take care of requirements for supply transportation.

In planning for the use of a troop transport battalion with an infantry division, one must first have a picture of where, when, and how the occasion for such use will arise. There will be many times when such a unit will be used in the movement of a division from one point to another when combat is not involved, the transport unit being present for the duration of the move only. Such cases are simple motor movements which any infantry division can make at any time. There will be other times when the troop transport battalion is attached to a division for an operation involving tactical movements in the combat zone, an attachment of some duration, probably during a preliminary training phase of several days or weeks and culminating in combat. In still different circumstances, the troop transport battalion may be attached to a large combat force, assisting in its move toward combat, but under conditions which prevent advance designation of the division or divisions with which it will finally operate. But it must be remembered that the motorization of the division is to accomplish only one thing, to permit rapid movement. The division fights and maneuvers dismounted; when it does, its extra transportation must get out of the way in order not to become a burden.

The scope of planning for the use of a troop transport battalion then is fairly well defined. It consists first of arranging for the initial distribution of the transportation to the units which need it. Secondly, it consists of arranging for temporary withdrawal of this transportation during intervals of combat when its presence would encumber the infantry unit, and its prompt return when the emergency is passed. Thirdly, it consists of arranging for prompt and orderly release of the transportation when its use is no longer necessary, or when the battalion is ordered away from the division. This planning must take into consideration the administrative and supply problems of the attached unit in maintaining itself as an organization, as well as face the fact that the troop transport battalion, in order to serve its purpose, at times must be broken up into small pieces and scattered throughout the division.

Initial distribution of the troop transport battalion consists of dividing it up according to the need for its transportation. We have seen that this need was originally met by the allotment to the division of two troop transport companies for each infantry regiment, other requirements to be met out of the division's own organic quartermaster transportation. The simplicity of this is so attractive that it can well be made the basis for allotment within the division. It preserves the integrity of the attached troop transport companies, simplifying their movement and administrative control. It is true that the strengths of regiments will vary in the field; however, this variation can be met by adjustments in the sizes of the designated troop transport companies by their own battalion commander on division order.

Movement of the division is usually accomplished in combat team formation. Distribution is then effected most conveniently by including the transport units in the combat team organization; for example:

Combat Team 1

1st Infantry Regiment
1st Field Artillery Battalion
Company A, 1st Engineer Battalion
Company A, 1st Medical Battalion
101st Quartermaster Troop Transport Company
102d Quartermaster Troop Transport Company
Detachment, 1st Quartermaster Company (five trucks).

The detachment of the divisional quartermaster company provides three trucks for the

engineer company and two trucks for the medical collecting company.

Providing for the allocation of transport on a combat team basis, rather than by direct attachment to the infantry regiment, has another advantage. It permits the close association so necessary for teamwork, yet allows for a measure of administrative control by the troop transport battalion commander, in the same manner as the medical battalion commander watches over his collecting company, for example. When "CT's cease," definitely a time when this attached transport is in the way, it can be disposed of as simply and effectively as the other supporting components of the combat team.

Some details of the arrival and departure of the transport, of course, can seldom be provided for in standing operating procedure. Times of arrival and departure, routes, points of control, and the like must be worked out for every situation by the division staff, the combat team commander, or the truck unit commanders.

The question of control of the transportation while in the hands of the combat team commander is one that should be covered in the training of the infantry regiment. It should be made possible for an infantry regiment to work out regimental and battalion exercises involving the use of attached troop transport.

Several factors are worthy of mention in this connection. The troop transport unit has no communications equipment in any of its echelons. Therefore, the regimental commander must provide any necessary signal means out of his own allotment. If the situation is such that the regiment must detruck temporarily, the surplus transport could be held in the area of the regimental trains, utilizing the normal communications in that area. Likewise, battalion and company commanders could under similar circumstances control this transportation, separated temporarily, by use of spare radios which they already possess. It is also possible that signal teams might be attached to the division from army units to reinforce normal communications channels.

When a serious engagement develops, it is unlikely that troop transport can remain with the infantry farther forward than some point in the development stage of combat. It is probable, therefore, that this troop transport would be disposed of under infantry battalion or regimental control if retained in the combat team at all. Large numbers of trucks make unwieldy formations; while the individual vehicle is fast and has a measure of cross-country ability, in large numbers these qualities fade rapidly. The ninety-six trucks which move the infantry regiment must therefore be kept far enough from the scene of combat to permit movements to be made rather deliberately.

Another reason for training troop transport and infantry together is to bring home to the commander his increased responsibilities for supply and maintenance and to give him a chance to work out these problems. Each troop transport company, of course, has its own administrative echelon, including unit supply and maintenance sections. However, the total of their requirements for Class I and III supply when added to that of the infantry regiment, and in situations where fuel consumption is high anyway, becomes a large problem for the regimental commander since he normally is responsible for his own replenishment from army supply points.

The trailers of the troop transport vehicles are useless for troop carrying, but do provide considerable capacity for supply reserves. A substantial reserve of Class I, III, and V supply can thus be carried by the combat team. The manner of distributing these supplies on the vehicles must be carefully coordinated with the type of control exercised over the transport. Bulk loading of supplies by the regiment would be inadvisable if rifle companies were habitually to retain control of their personnel carriers.

All planning for the use of attached troop transport must be kept on a simple and easily understandable level. There will be times when it will not be possible for the division to break in the transport battalion on a complex and unique standing operating procedure. The plan must contemplate the use of truck units uninstructed in any other than the prin-

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ciples of motor operation common to the theater or the army as a whole. The use in the division of peculiar methods of column control, unorthodox signals, and other procedures not widely known in the army will prove to be a distinct liability when the columns are interspersed with strange vehicles and drivers. On the other hand, a troop transport battalion should be expected to be intimately familiar with the details of organization of the infantry division and with normal channels of command. The personnel of the battalion should be expected to have training in basic field soldiering, including the effective use of the weapons with which they are plentifully provided. The most useful attribute that either the infantry division or the troop transport battalion can have, however, is adequate experience in working with each other.

War Department Lubrication Orders

WAR Department Lubrication Guides, helpful and familiar wherever military equipment is maintained, are now to be known as War Department Lubrication Orders. This new redesignation is made in Circular No. 114, dated 21 March 1944. The following are the paragraphs in the circular which refer to the Lubrication Orders:

1. LUBRICATING ORDERS.—1. *a.* War Department Lubrication guides are redesignated as War Department Lubrication Orders.

b. War Department Lubrication Orders are illustrated, waterproof, numbered, and dated cards or decalcomania labels which prescribe approved first and second echelon lubrication instructions for mechanical equipment issued by the technical services, Army Service Forces. They will be carried with or attached to, the equipment to which they pertain. Instructions contained therein are mandatory.

2. Lubrication Orders presently available will be listed in FM 21-6, 1 February 1944, and subsequent monthly changes thereto.

3. Unit Commanders will be responsible for obtaining, installing, and complying fully with all current War Department Lubrication Orders that are applicable to equipment within their commands. Difficulties experienced in the performance of these responsibilities will be reported through technical channels to the Commanding General, Army Service Forces, Attention, Maintenance Division.

It should be noted that the use of the Lubrication Order is now mandatory, and that unit commanders will be held responsible for obtaining them and seeing that they are used in connection with the equipment in their commands.

But while Lubrication Orders are now made mandatory, it has been shown that using organizations are quick to demand them as soon as it is known they are available.

In recent months a poster explaining the advantages of the Lubrication Orders and telling where they could be obtained was prepared by Maintenance Division, ASF, and distributed to posts, camps, and stations. On the heels of the poster's distribution came word from the manufacturer of the Lubrication Orders that requisitions from the field had risen in one month six hundred percent.

Technical Manuals now in preparation avoid any direct mention of lubricants by specification. Emphasis is placed squarely on the Lubrication Order as the latest and most reliable authority on lubricants to be used.

With the Technical Manuals covering the subject in a general way and the Lubrication Orders giving the specific detailed information required, changes can be made as desired in later editions of Lubrication Orders without bringing manuals and orders into conflict.

This is all as it should be. One edition of a Lubrication Order can be superseded by a new one almost overnight. Technical Manuals cannot be so readily revised and republished. —(Prepared for the MILITARY REVIEW under the direction of the Director, Maintenance Division, Army Service Forces.)

The Application of Air Power in Combined Operations in SWPA

COLONEL MAX F. MOYER, *Air Corps*
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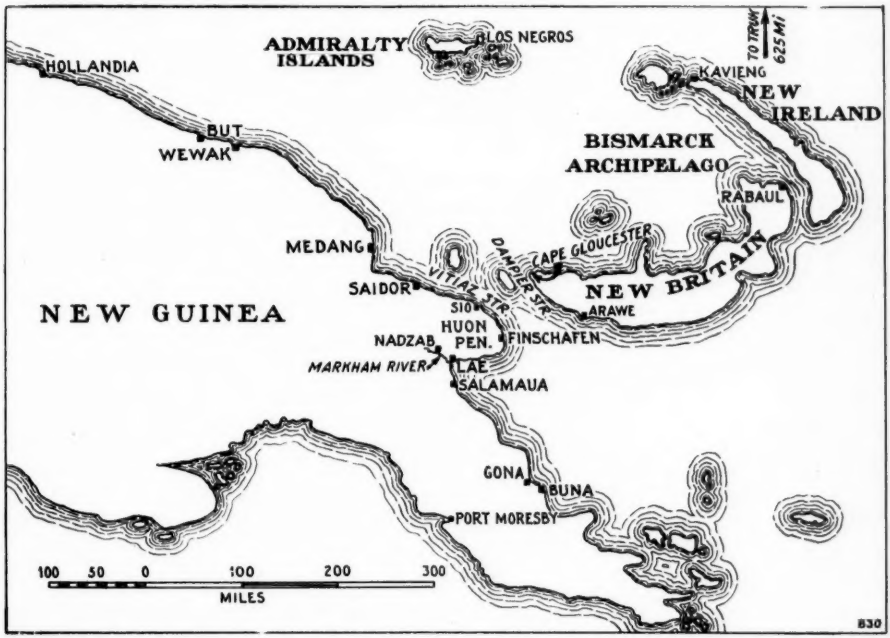
THE part played by the Fifth Air Force in the series of landings on New Britain Island and on the north coast of New Guinea is an excellent example of the application of air power in combined operations.

Most major operations in the SWPA (Southwest Pacific Area) are combined operations in which the air forces, the ground forces, and naval forces play interdependent roles. The geography of the area and the nature of the terrain are such that the ground forces must depend upon either the navy or the air force or both to transport them to their objectives, cover their landings, and supply their troops. The air force can not move forward to new airdromes and advance the bomb line until the ground forces have captured advance air bases. The navy, in turn, is dependent upon the air force to cover its fleet movements and protect its operating bases. All three forces are working to a common end under a common plan, with the objective of pushing forward all of our forces through the Jap outposts so that we may place ourselves in a position to strike at the main Jap strength in his homeland. The recent landings on New Britain and New Guinea demonstrate that the Southwest Pacific Forces have developed a pattern for combined operations that spells "success."



This article deals primarily with the part played by the allied air forces in SWPA in the application of air power to these combined operations and the ones to follow.

The stage was set for a major forward move of our forces after the capture of Salamaua, Lae, Nadzab, and Finschafen. Our allied ground and air forces drove the Japs

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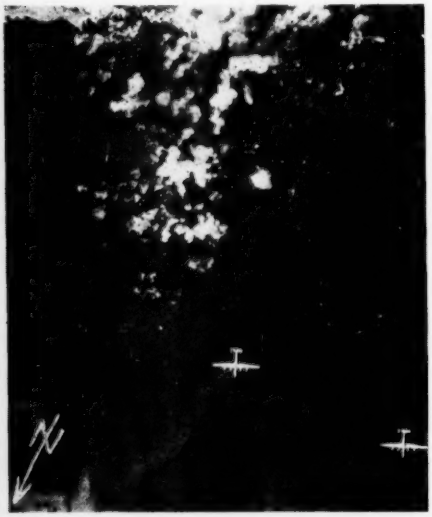
out of the Markham Valley and the Fifth Air Force rapidly established air bases there. Construction was started on an airdrome on the tip of the Huon Peninsula at Finschafen almost before the last Jap on the site had been killed.

These air strips provided the necessary bases from which fighter planes might operate to escort and cover bomber strikes on Jap airdromes and shipping along the north coast of New Guinea. Fighters from these bases could also readily cover convoy and fleet



B-24's of the Fifth Air Force softening Jap installations at Amalut Plantation, Arawe, New Britain, 14 December 1943, the day before the landing.

movements through the Dampier and Vitiaz Straits into the Bismarck Sea. And they were within reasonable fighter range of the proposed landings at Arawe and Cape Gloucester.

The pattern followed by the Fifth Air Force in preparation for the combined operations follows very closely the doctrine expressed in FM 100-20. Their first objective was to achieve air superiority, which was done to a remarkable degree.

They conducted heavy and repeated bombing and strafing attacks on all of the Jap airdromes from But and Wewak on the north coast of New Guinea to Rabaul, New Britain, and Kavieng, New Ireland, destroying large numbers of Jap aircraft and supplies on the ground. In addition, substantial numbers of Jap fighters that attempted to intercept these bomber formations were destroyed in the air. As a result, the Nips withdrew the bulk of their aircraft in New Guinea to Hollandia, beyond our normal fighter-escorted bombing range and withdrew most of their planes on New Britain to airdromes around Rabaul and to Kavieng on the northern tip of New Ireland. The Fifth Air Force obtained almost complete air superiority in the area where the landings were to take place. Jap shipping in all waters within range of our aircraft had long been a target high on the priority list for all allied aircraft. The Jap's existence in this area depends upon his ability to supply his forces by water transport. Our repeated and successful air attacks on his shipping had by this time forced the Nip to resort almost entirely to barge traffic at night along the coasts. Even his night barge traffic was seriously interrupted by the activities of the navy's PT boats which went out each night on barge hunts.

With the stage thus set, GHQ issued the order initiating the combined operations, of which the landings at Arawe, Cape Gloucester, and Saidor were to be the first.

Just prior to the landings the air force temporarily neutralized the Jap airdromes within striking distance of the landing beaches. Runways were thoroughly bombed, supply installations were destroyed, and the airdromes were generally rendered inoperative for the period of the proposed landings.

The Nip troops and supply installations in areas at and surrounding the landing beaches were thoroughly bombed and strafed just prior to D-day and again on the morning of D-day.

Both the navy and the air force supported the landings with well coordinated fires. At Cape Gloucester, for instance, our planes went in just as the naval guns, shelling the beach, ceased firing, and strafed the beach until the first assault wave was within about 400 yards of the beach. Low-level bombers, dropping

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AUSTRALIAN TROOPS CROSSING THE MARKHAM RIVER IN RUBBER BOATS IN THE VICINITY OF NADZAB. THESE TROOPS CLEARED THE JAPS FROM THE MARKHAM VALLEY AND MADE POSSIBLE THE ESTABLISHMENT OF ADVANCED AIRDROMES FOR THE FIFTH AIR FORCE.

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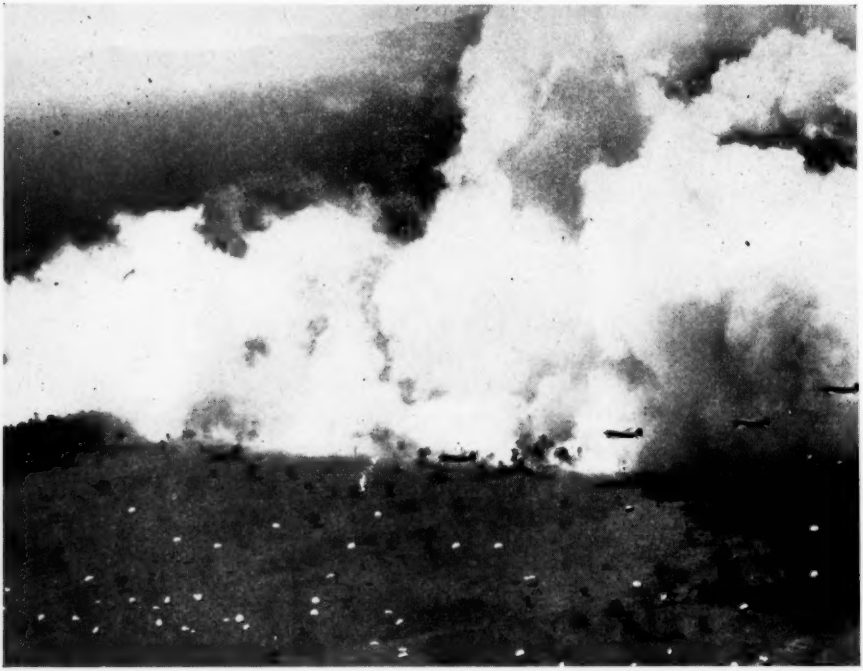
WP bombs, laid down a most effective screen on Target Hill, a high point of ground which overlooked the beach at Cape Gloucester, and neutralized this strong Jap position until the first assault waves were ashore.

The air force, on D-day during each of the landings, provided a continuous fighter cover for the naval convoy from the first light until dark. Additional fighter formations made sweeps to intercept Jap air formations coming down from Rabaul and Kavieng, with the result that very few of the Jap aircraft that started out to interfere with the landings reached their destinations, and large numbers of them were destroyed by our fighters.

The air force also placed bombers and strafers on both air and ground alert ready to make strikes on both pre-arranged targets and targets of opportunity on call from the task force commander.

The coordination between all three forces, naval, air, and ground, and the timing of the various phases of the landings were excellent despite poor communication facilities.



THE SUCCESSFUL PARATROOP LANDING AT NADZAB, WHICH RESULTED IN THE CAPTURE OF THAT IMPORTANT AIRFIELD AND PREPARED THE WAY FOR THE LATER ASSAULTS ON NEW BRITAIN. NOTE THE EFFECTIVE SMOKE SCREEN LAID BY THE FIFTH AIR FORCE.

The successful landings at Arawe, Cape Gloucester, and Saidor, and the subsequent developments of our positions at these points, have already had far reaching results. Our navy is now operating freely in the Bismarck Sea. Our air force has an airdrome at Cape Gloucester which advances the bomb line several hundred miles closer to the Jap strongholds in the Bismarck Archipelago. And several thousands of Jap troops are trapped between the ground forces landed at Saidor and the Australians pushing up from Sio on

the north coast of the Huon Peninsula. The Nips in this trap are effectively shut off from supplies and reinforcements and are being methodically liquidated.

The most recent landing of our allied forces on Los Negros Island in the Admiralty Islands and the capture of the airstrip there constitute a serious threat to the remaining Jap positions in the Bismarck Archipelago.

The full results of this forward movement of all of our forces in the SWPA are yet to come. The threat to Jap supply lines from Truk to his strongholds at Rabaul and Kavieng is so great that his entire position in New Britain and New Ireland is rapidly becoming untenable.

Both the air and naval harassing of Jap supply lines along the north coast of New Guinea are making the positions of his troops in that area very precarious and difficult to support. Our forces hold the initiative. The Nip is wondering where the next blow will fall.

Wherever it falls, you may be sure it will be a combined operation with the air, ground, and naval forces applying the full extent of their power in a well planned, coordinated attack.

Supplementary Information for Photomaps

A REPORT from the Army Ground Forces Board in the Southwest Pacific Area has this to say about the importance of training in terrain sketching: "In the jungle accurate maps are usually lacking, and aerial photos and photomaps are widely used. However, many ground features which are hidden behind the dense jungle growths are not revealed on such photos. It is necessary, therefore, to supplement and refine these aerial photos and photomaps with field sketches, and engineer troops must be aided in this task by all units. Selected personnel of all units should receive special training in field sketching so that the data necessary for the revision and amplification of photomaps may be quickly collected and forwarded to higher echelons. For this advanced training, a knowledge of map reading, of conventional signs and symbols, and of the detail significant from a military point of view are prerequisites."

Occupation of Antiaircraft Positions at Night

FROM Italy comes this sound advice to antiaircraft units on the occupation of positions at night:

"Occupation of positions at night is one of the most difficult maneuvers of AA and one which has received the least attention. The following points should be stressed:

"1. In training, gun sections and headquarters must take everything as if they were never to return to their former location. If this is not done, important items will be forgotten and left behind when the time comes to move for keeps.

"2. Allow only one boss on a job to talk. When more than one man gives instructions there is a loss of time, and confusion results. However, make the boss talk in a low tone.

"3. Do not allow a single flashlight. If there is any light at all the men will depend upon it and will not develop a sense of night vision.

"4. The best way we have found to get our vehicles from their final assembly point on the road into the position area, and also for leading them to cover after they have unloaded guns and equipment, is to have two leaders on foot with luminous discs precede each vehicle.

"5. Loading and unloading must be done the same way each time; there must be a definite procedure for the occupation of a position."

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"Most of Our Major Problems Have Turned Out in the End to be G-1 Problems"

LIEUTENANT COLONEL HARRY A. BALLF, *Field Artillery*
Instructor, Command and General Staff School

"MOST of our major problems have turned out in the end to be G-1 problems."

This frank and simple statement of fact is an exact quotation from the letter of a commanding general in overseas service. The same opinion has been expressed by many observers returning from theaters of operations.

These G-1 problems are not confined to field armies in the combat zone, but they are encountered in base sections, advance sections, and various installations in the communications zone. They are not usually the same specific problems, however.

Combat elements are more likely to be concerned with replacements, morale, the postal service, rest, and rehabilitation. The communications zone G-1 finds himself equally interested in replacements, but also very much concerned with prisoners of war and often with the control of the civil population.

There is a great deal of written material on the duties and functions of the personnel chief in field units, but the officer who draws the G-1 assignment in the communications zone finds that he has very little detailed doctrine and dogma to lean on. He finds himself practically starting from "scratch" and building his own procedures to meet specific problems.

Due to the lack of personnel, all sections of the communications zone headquarters have been organized quite simply. The duties of the general staff sections are to coordinate those functions of the services which pertain to the normal activities of the particular G section. This coordination takes the form of supervision.

Before beginning a discussion of the functions of a communications zone G-1 section, it should prove helpful to make a typical chart showing the allocation of activities to various subsections. A combined organization and functional chart of the G-1 section would look something like this:

G-1 SECTION, COMMUNICATIONS ZONE

Asst Chief of Staff G-1

Executive

Assistant to the Chief of Section. Coordinates the activities of the subsections and reapportions work when an emergency requires a temporary readjustment of work assignment. Responsible for the discipline of the section.

ADMINISTRATIVE Subsection	ASSIGNMENT Subsection	PRISONERS OF WAR Subsection	MISCELLANEOUS Subsection
Office management	Replacements	Administration of prisoners of war	Special service activities
Reclassification	Assignments	Use of prisoners	Postal service
Promotions	Transfers	Numbers	Recreation
Demotions		Capacity of camps	Religion
Appointments		Evacuation	Decorations, citations, honors and awards.
Leaves		*Control of civil population	Punishments
Furloughs			Sanitation
			Graves registration

*Could be a separate subsection—CIVIL AFFAIRS Subsection.

The assignment of functions to these subsections is not dogmatic, although certain specific items logically fit better under one than they would under another. A command decision might alter the setup to fit requirements; for example, the particular training of the chief of one subsection may better qualify him to handle an item of work that should logically be placed under another.

A typical personnel section has in addition to the Chief, an Executive, and three, four, or five subsections charged with specific duties relating to administration, assignment, prisoners of war, possibly civil affairs, and miscellaneous matters.

Upon inspection of the functions assigned to the subsections on the chart we find that each has one or two activities that are normal and routine to the personnel officer of a combat unit, but which assume much more importance under conditions peculiar to the communications zone.

As a part of its activities relating to office management the Administrative Subsection in one communications zone, for example, has countered the lack of written material on procedures and methods by building a rather complete and detailed "policy file" which is kept constantly up to date.

This is accomplished by having each subsection maintain a policy file of its own, and requiring that it furnish a copy of all papers in this file to the headquarters chief clerk for inclusion in a "master policy file."

Everyone in the headquarters is directed to be on the lookout for new policy, whether it be a verbal decision of the Commanding General, or a decision in writing. As soon as a verbal policy is received, it is immediately reduced to writing and initialed by the officer concerned.

This subsection is also charged with reclassification, which takes on a broader aspect in the communications zone. Cases originating within the zone are processed and mechanically checked for correctness by the Adjutant General, and after all pertinent information has been obtained, are referred to G-1 for indication of action desired.

G-1 checks the papers with a view to utilizing the services of the officer within the communications zone and eliminating reclassification if possible under the circumstances. He then submits his recommendations to the Chief of Staff, who returns the papers, transmitting the Commanding General's instructions to the Adjutant General through G-1.

If reassignment is directed, it is accomplished at the headquarters of the communications zone, but if reclassification is initiated the papers are referred to the theater headquarters with appropriate recommendations.

Cases originating outside of the communications zone are forwarded by the theater headquarters, through the zone, to the board. The communications zone merely transmits the papers as a communication channel. However, the Adjutant General checks the board proceedings for administrative correctness before returning them to the theater. Only those cases are referred to G-1 where dismissal from the service or other unusual action is directed, and then only to note for his information.

The other items which we have listed under this subsection are handled more or less according to procedures laid down for the personnel section of combat units.

A major part of the work of the Assignments Subsection is concerned with replacement operations and all matters pertaining to replacement depots. The communications zone replacement depot consists of a headquarters and headquarters company with two or more replacement battalions equipped to house, feed, and administer replacements while they await assignment, or transfer to a replacement depot farther forward.

An important source of replacements within the theater consists of personnel to be returned to duty from hospitals. Those who are discharged from field and evacuation hospitals in the communications zone are returned to their units whenever practicable through normal replacement channels.

While in the depot, officer and enlisted personnel alike undergo training of one sort or another depending on their combat experience. Usually this training consists of battle courses peculiar to the theater, and, if necessary, specific training designed for physical hardening of the individual. Trainer personnel are furnished by the theater commander and are not organically a part of the depot overhead.

Instructions to the communications zone replacement depots to forward replacements are received either as written requisitions on WD AGO Form No. 211, by teletype, or by telephone call which is later confirmed by teletype or written requisition.

When these instructions are received by the communications zone headquarters the replacements are forwarded by the most suit-

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able transportation. They move in casual detachments properly organized and under the control of a suitable number of officers and noncommissioned officers to maintain proper discipline.

Arrangements for travel and for rationing en route are made by the communications zone replacement depot which forwards the replacements. The records pertaining to individuals are placed in the charge of the officer in command of the movement and are turned over to the unit receiving the replacements.

An item of considerable interest to this subsection is the actual assignment of individuals. The Adjutant General has a Personnel Section which maintains a suspense tickler on all individuals who have been requisitioned by name or by qualification. When such personnel arrive the recommendation of the head of service concerned is obtained in determining their disposition.

If a requisition is submitted by a service for a detachment of officers and men to perform a specific function the service will receive notification of the shipment of this personnel when such information is furnished in advance by the War Department. It is notified in any event of the subsequent arrival of the shipment so that steps may be taken for its proper disposition. Such detachments are assigned shipping numbers to effect their identification.

The transfer of individuals between installations of the communications zone or to the combat zone and to installations in the zone of the interior is more or less routine procedure.

The Prisoner-of-War Subsection is charged with the administration of prisoners, including prisoner-of-war escort guards, but actual operations with reference to prisoners of war are carried on by the Prisoner-of-War Administrative Section of the Provost Marshal's office, in the communications zone.

The Provost Marshal furnishes G-1 a daily numerical list of prisoners located in various prisoner-of-war camps. This list is then checked against a chart maintained by the Prisoner-of-War Subsection, which shows the normal capacity and emergency expansion facilities of all the prisoner-of-war enclosures, together with the number of guards at such camps.

No action is necessary in the G-1 Section until such time as the prisoners of war on hand equal in number approximately 75% of the normal capacity of PW camps or enclosures. When this percentage is reached consultation is had with the Provost Marshal and G-4, so that further arrangements may be made for any unexpected arrival of prisoners and for evacuation of those on hand.

It will be recalled that in the North African campaign prisoners of war were taken in large numbers. The prisoners handled by communications zone installations there ran into the hundreds of thousands. This unexpected development necessitated a rapid readjustment of means and facilities for processing the prisoners.

The evacuation of prisoners of war to the zone of the interior is accomplished by using transports and cargo ships which normally carry personnel and are equipped with prisoner-of-war escort guards and medical detachments assigned to the ships at the United States ports of embarkation.

If ships are not so equipped, or if there is insufficient escort guard personnel available under the control of the Provost Marshal, of the communications zone, a call is made on G-1, who then makes the necessary arrangements through G-1 of the theater to draw from units in the area.

Our chart includes control of the civil population under the PW Subsection.

Considerations of unity of command usually require that military administrative area commanders in the communications zone be given control of civil affairs within their areas. Some thought has been given to the inclusion of a Civil Affairs Officer on the general staff level. If this occurs, then G-1 is relieved of the responsibility for this activity.

However, until such a policy is announced this function will be charged to G-1. If the volume of work is great in connection with

the control of the civil population it is sometimes advisable at least to have a subsection of G-1's office charged with this activity alone. Our chart would then show a Civil Affairs Subsection.

This section would be charged with all matters concerning organization, supervision, and control of military government in the area, and it would be required to furnish full information on the character of the people, the nature of the government, and the specific civil affairs problems to be met in that territory.

Under the Miscellaneous Subsection we have grouped various morale activities, or those items which have the most profound effect on the development of a wholesome attitude toward the tasks at hand.

It is desirable to keep men on duty in a foreign theater in a better environment than is usually found in the cities and towns of occupied territories. Special Services operate a number of activities serving units in the field and in cities to aid in this situation.

The American Red Cross Clubs and Clubmobiles have been found to be a splendid method of providing clean and congenial meeting places. These units have facilities such as writing rooms, libraries, and similar gathering places to occupy the leisure time of the men and to afford an opportunity for quiet recreation.

Many remarks similar to the following have been received from commanders in foreign service: "Mail is as necessary as physical comfort and good health. There is more morale built in prompt receipt of mail than in any single thing that can be done by the Army." Some say that it is as essential as good food and equipment and that it is the greatest single morale factor.

Certainly the commander who has the morale of his men in mind will require his G-1 to give this item "No. 1 priority."

So far as recreational facilities and the like are concerned it has been found very desirable to work with the Navy and to extend all assistance possible to its personnel at all times. This policy brings noticeable improvement in mutual understanding and each of the services contributes some equipment and facilities that the other lacks.

Other items such as religion, decorations, rewards and punishments, and the like, which are placed under the Miscellaneous Subsection, closely follow the methods and procedures employed in troop units. This subsection is also charged with other G-1 functions not specifically covered under the first three subsections of the chart.

It must be remembered that there is a great variation in living conditions in the various theaters of operations of this global war. The European Theater, parts of the Southwest Pacific Area, and the South Pacific have local populations and habits, language, temperament, and standards which are similar to those in the United States. Men in these areas can see American films shown commercially, and have dates with English-speaking girls. They generally find or can be provided with entertainment and diversion just as at home.

Contrast this situation, however, with some of the areas in North Africa and the islands of the Pacific. The soldier there is an "outsider." For various reasons he cannot mingle freely with the population. It is necessary in cases of this kind for the Special Services to be more active and energetic than usual in their efforts to afford recreation and entertainment.

On the whole, the G-1 activities and functions are very much the same anywhere, but different localities and situations will emphasize some particular problems that in another theater would be handled as more or less routine procedure.

The officers assigned to the duties of a G-1 section must be practical and have a wealth of good common sense. They must be able to make rapid adjustments to local and changing conditions. The operating agencies, particularly the Special Services, must be able to improvise with the material on hand.

The American soldier is not exacting. If he knows that everything possible is being done for him he will go more than half way to help eliminate causes of dissatisfaction.

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The Navy's Seabees

LIEUTENANT F. M. MOSLEY, *Civil Engineer Corps, USNR*

THE quick succession of early Japanese victories, particularly Guam, Wake, and the Philippines, underlined the futility of attempting further advance base construction in the Pacific with civilian employees as the chief reservoir of labor.

The Bureau of Yards and Docks, the Navy agency charged with the construction and, with some exceptions, the maintenance of shore establishments, concentrated instead on the rapid expansion of its new construction battalions, the Seabees. These skilled manual workers, wearing Navy "blues," were to be trained to defend as well as build the innumerable port facilities, airfields, and other military installations the Navy would require to carry our amphibious war into Japan's home waters.

Prior to the 7 December raid on Pearl Harbor, the Navy had viewed the proposed construction battalions as a small, select group, numbering no more than 3,300 officers and men, whose work primarily would be of a supervisory nature, overseeing the activities of civilian construction men. With the coming of war, the Bureau of Yards and Docks mapped a more ambitious program for its Seabees. These uniformed builders, as much a part of the armed forces as the Army Engineers, would replace civilian personnel at advanced bases as rapidly as possible and, under the supervision of the Navy's Civil Engineer Corps, construct and defend all future bases in the forward and combat area.

From their first wartime quota of 6,000 men, the Seabees grew to their present authorized strength as of 1 January of 253,600 enlisted men and 6,700 Civil Engineer Corps officers.

Seabee enlisted personnel was recruited entirely on a voluntary basis from the winter of 1942 to the following summer. Recruiting appeals were directed to mature men with years of civilian construction experience behind them. The great majority of Seabees were specialists in their trades at the time they entered the service. In January 1943, some drafted men were assigned to the Naval Construction Battalions to form a pool of unskilled labor. Voluntary induction ceased on 31 October 1943, as the Seabees' authorized strength approached fulfilment.

The enlisted men who had volunteered for service with the Seabees were given regular Navy rates commensurate with their civilian experience. A journeyman carpenter, for example, would have been rated a second class petty officer; a construction foreman, a chief petty officer. Most Seabee battalions, accordingly, have an unusually high percentage of rated men.

For the same reason, the Seabees as a group are older than the average fighting unit. Some of the early battalions averaged from thirty-four to thirty-six years. From a military standpoint, the advanced age of the enlisted personnel would be a handicap in an exclusively combat organization; in the Naval Construction Battalions, in many ways it has proved a distinct advantage.

The Seabees' primary mission has been to build. Their combat training, while vital, has been essentially a defensive precaution. The average Seabee is not likely to be called on for combat missions requiring the sustained powers of endurance of which younger men are capable. On the other hand, the tedious, sometimes monotonous routine imposed by the average construction assignment, and the lonely island outposts on which many Seabee battalions find themselves for considerable periods of time, both call for the seasoned outlook and steadying influence of a more mature group of men.

In carrying on the Bureau of Yards and Docks' overseas construction work, the Seabees are commanded by officers of the Civil Engineer Corps, the same corps which executed the Bureau's naval shore construction program in the United States. This active command by the Civil Engineer Corps is an innovation of World War II. Previously, Civil Engineer Corps officers had served only in staff capacities. With the creation of the Seabees and the need for engineering-trained

officers to lead them, the Civil Engineer Corps assumed command as well as staff responsibilities.

The first Seabee battalion was mustered at Quonset, Rhode Island, then to NYA camps, and then to Camp Allen, near Norfolk, Virginia. Later, Camp Bradford, also near Norfolk, became a Seabee receiving station. Ultimately a new base, Camp Peary, just outside of Williamsburg, Virginia, housed incoming Seabee "boots." Intermediary training has been given at Camp Peary and Camp Endicott, Davisville, Rhode Island. Advanced Base Depots at Davisville; Gulfport, Mississippi; and Port Hueneme, California, where battalions have been assembled prior to embarkation, also have been used for advanced military and technical (construction) training.

Seabee training has always been predominantly military. The men are assumed to have the requisite construction skills at the time they enter the Navy.

Basic training has averaged about four weeks and intermediary training the same period. The amount of time available for further advanced schooling has been dependent upon the need for construction battalions overseas and upon available shipping.

Training has been along infantry lines with particular stress on jungle tactics. As the majority of Seabee battalions are scheduled for ultimate assignment to the Pacific zone, officers and enlisted personnel are also schooled in the fundamentals of amphibious operations. While it is not likely that most Seabees will in the ordinary course of events be called upon for combat duty, the Navy believes in having them thoroughly prepared against the eventuality.

A Seabee battalion is planned to be a self-sustaining organization. It has four construction companies, each of 226 men, and a headquarters company of 177 men. The total enlisted complement numbers 1,081 men.

By trades, the headquarters company is made up of two armorers, eight bakers, two barbers, four boatswains, eight chainmen, four chauffeurs, four chiefs of party, twelve clerks, twenty-four cooks, two officers' cooks, thirty-one construction workers, four divers, three architectural draftsmen, two electrical draftsmen, two mechanical draftsmen, three structural steel draftsmen, four hospital attendants, four instrument men, one labor foreman, two mail clerks, sixteen mess attendants, four pharmacist's mates, two photographers, four rodmen, one sailmaker, two signalmen, four stewards, two officers' stewards, and sixteen storekeepers.

The first platoon of each construction company is a maintenance and operations unit. By trades, it includes one building blacksmith, one building blacksmith's helper, four carpenters, seven construction workers, six electricians, three gas and diesel repairmen, one labor foreman, one launchman, three shop and station mechanics, three crane and engine oilers, one sheet metal worker (coppersmith), one telephone switchboard man, three water tenders, and one welder. Total, thirty-six men.

The second platoon is a construction platoon. By trades, it includes sixteen building carpenters, three concrete workers, six construction workers, three line and station electricians, one electrician, one labor foreman, two painters, three pipefitters and plumbers, one sheet metal worker, one steelworker, and one telephone switchboard man. Total, thirty-eight men.

The third platoon is also a construction platoon, but its complement differs slightly from the second. By trades, it includes sixteen building carpenters, eight construction workers, three line and station electricians, one labor foreman, two shop and station mechanics, two painters, three pipefitters and plumbers, one rigger, and two sheet metal workers. Total, thirty-eight men.

The fourth platoon of each construction company is composed of specialists in roads, blasting, excavation, and outdoor construction. By trades, it includes three bulldozer operators, twenty-one construction workers, two quarry drillers, one excavation foreman, one labor foreman, one quarry crusher mechanic, two shovel (gas and diesel) operators, one powder man, one powderman's helper, one road machine operator, and

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four truck drivers. Total, thirty-eight men.

The fifth platoon is for waterfront operations. By trades, it includes ten construction workers, one crane operator, two dredge deckhands, three engine operators, two dredge firemen, one launchman, one dredge mate, two crane and engine oilers, two crane and dredge oilers, one pile driver foreman, two riggers, and eleven wharf builders. Total thirty-eight men.

The sixth platoon specializes in tanks, steel, and pipe. By trades it includes ten construction workers, two painters, nine pipe-layers, four riggers, nine steelworkers, and four welders. Total, thirty-eight men.

The battalion's thirty-two officers include twenty-six Civil Engineer Corps officers, two doctors, a dentist, two supply and dispersing officers, and a chaplain.

In addition to the basic construction battalions other Seabee units have come into being as a result of special needs.

To solve the difficult cargo handling problem which arose out of the continuing westwardly movement into the islands of the Pacific, the Bureau of Yards and Docks developed specialized stevedore and rigger units, officially designated as Construction Battalions, Special. Thirty-five of these have been authorized; about half of which are now on active duty at major bases in the Pacific.

These Special Battalions include a nucleus of men with civilian training or experience in loading and unloading ships as employees of steamship and stevedoring companies. Recently the demand for such trained personnel has made it necessary for the Bureau of Yards and Docks to establish its own specialized training facilities. At Camp Peary two simulated training ships have been built, complete with all the loading and unloading gear used by Liberty Ships.

The training course includes all the major phases of cargo handling: the operation of winches, tending gangway, slinging and tiering of freight, cooperage, gear maintenance and repair, and the mechanical aspects of the handling of freight on the pier or dock by the use of tractors, lift trucks, dock cranes, conveyors, and similar labor-saving devices. Actual and simulated packages are loaded into the training ship from the dock and then unloaded until the operation becomes smooth.

The Construction Battalions, Special, also receive the same military training as the regular Naval Construction Battalions.

Officers for the Construction Battalions, Special, as far as possible are drawn from the ranks of professional stevedores. The Navy also maintains a novel Stevedore Training School in New York where officers receive intensive training in cargo handling and have an excellent opportunity to study practical stevedoring on the piers and docks of a major port.

Construction Battalions, Special, number 1,010 enlisted men and thirty-four officers.

By trades, enlisted personnel are assigned as follows:

Headquarters Company: two armorers, eight bakers, two barbers, four boatswains, four chauffeurs, six clerks, one commissary steward, twenty-four ship's cooks, two officers' cooks, eighty-seven longshoremen, two hospital attendants, two mail clerks, sixteen mess attendants, five pharmacist's mates, one photographer, one sailmaker, two signalmen, and nine storekeepers. Total, 178 men.

First Platoon (Maintenance and Operations): one building blacksmith, one blacksmith's helper, four building carpenters, ten construction workers, six electricians, three gas and diesel repairmen, one labor foreman, two launchmen, three shop and station mechanics, three crane and engine oilers, one sheet metal worker, one telephone switchboard man, two water tenders, one welder, and one stevedore gear issue man. Total, forty men.

Second, Third, Fourth, and Fifth Platoons (Stevedores and Longshoremen): each platoon; one hatch boss, one gangway man, two winchmen, one leading slinger, eleven slingers, one leading trucker and tierer, eight truckers and tierers, one wire splicer, one manila rope splicer, five head hatch checkers, five truck drivers, and five guards. Total, each platoon, forty-two men.

Such organizations as the War Shipping Administration have favorably compared

the work of these special units with the performance of professional stevedores and longshoremen in the United States.

Construction Battalion Maintenance Units, consisting of five officers and 270 men, have been organized to take over the maintenance of a completed advance base and free a full battalion or more of Seabees for further construction.

Approximately 2,000 Seabees are being given special training in the assembly and use of ponton causeways, the floating ramps which at Sicily proved so successful for the unloading of cargo from invasion craft. These men are later assigned to Seabee detachments which specialize in the handling of pontons.

Each Marine Division, besides its own engineers' battalion, also has a battalion of Seabees as part of its complement. These men, while on duty with the Marines, wear Marine uniforms instead of regular Navy garb.

The first detachment of the 130,000 Seabees now on foreign soil left the United States in January 1942. Its first job was to build fuel supply depots along our Australia lifeline. Battalions following soon on their heels built the bases which serviced American warships going into the Coral Sea battle, and the airfields from which our air force first struck at Guadalcanal.

Arriving on Guadalcanal 1 September 1942, the Sixth Naval Construction Battalion earned a presidential citation. These Seabees not only maintained Henderson Field through incessant bombing and shelling but also built the companion strip from which American planes later turned back the threatened Japanese counter invasion. Other battalions followed and undertook construction of additional fields, roads, tank farms, and other installations.

Seabees have been stationed in Great Britain, Argentia, Bermuda, Panama, Trinidad, North Africa, and other Atlantic theater bases. They participated in the invasions of Sicily, Salerno, and Nettuno, in all instances manning the new ponton causeways developed by Captain John N. Laycock of the Navy's Civil Engineer Corps. Together with Army engineers, they have constructed a vast chain of bases in the Aleutians. But probably their greatest effort has continued to be in the South Pacific where they have participated in every major amphibious operation. They have moved in on the heels of assault troops in the Solomons, New Britain, New Guinea, the Gilberts, and the Marshalls.

Their work at Bougainville has been typical. Here Seabees landed under fire and set to work immediately under what has been described as "perhaps the worst conditions American troops have encountered." Rain fell continuously. The ground was a spongy mess. Construction was begun in jungle so thick Marines could not use mortars or grenades because of their inability to loft them out of their own territory.

Despite weather, terrain, and enemy opposition in the shape of artillery barrages, bombing, and incessant sniping, the Seabees in five weeks superimposed a 4,200-foot fighter strip on a swamp. Thirteen days later they had completed Piva Field, 6,500-foot base for light and medium bombers. A third field was ready for use within ninety days after D-day.

They followed this up by landing at Treasury Island, thirty miles off Bougainville, to begin work on another field designed to tighten the aerial pincers on Rabaul.

At Cape Gloucester, Seabees went to work on two Japanese airfields the same day they were captured by the Marines. Marine units established defensive perimeters around the fields and repulsed enemy counterattacks while the Construction Battalions repaired the damaged strips.

Seabees landed during the third day of the attack on Tarawa. Twenty-four hours later, an American plane made an emergency landing on the partially rebuilt airfield. Two days later, squadrons of fighter planes were using the field and transport planes were arriving and departing regularly.

In the Marshalls, Seabees had the Roi airfields in usable condition within a week after occupation of Kwajalein atoll.

Commander Joseph P. Blundon, Civil En-

gineer Corps, USNR, who was officer in charge of the first Seabee battalion to land on Guadalcanal, believes American superiority in base construction in the Pacific area, as proved by Seabees, Marine Engineers, Army Engineers, and Army Aviation Engineers, will prove to be one of the vital factors in eventual victory.

"I speak conservatively," said Commander Blundon, "when I say that our Seabees can build from four to five times as fast as the Japs.

"Further, our men have been building airfields on difficult terrain. The Japs, using slow hand labor, are limited to easily converted sites such as coconut groves. On Guadalcanal at least, they apparently did not use such equipment as carry-alls, power shovels, or equipment to tamp back fills and bomb craters.

"One Seabee operating a twelve-cubic-yard carry-all can move as much dirt in a day as 150 Jap laborers," the Civil Engineer Corps officer continued. "We have found that 100 Seabees can completely repair the damage of a 500-pound bomb hit on an air strip in forty minutes, including the replacing of the steel mesh mat. The same repair job would take the Japs more than three hours, and then they would only have filled the hole with untamped dirt."

Even their hand tools—shovels and picks—are only two-thirds the size of those the Seabees use—reflecting, he believes, the Japs' lack of physical strength.

Seabee battalions may be assigned overseas individually, as components of construction regiments or brigades, or as part of functional units which will be referred to hereafter in this article as "A," "B," and "C." Each of these functional units is composed of a standard selection of functional components (technical or professional personnel, equipment, materials and buildings) capable of constructing, equipping, operating, and maintaining a self-sustaining, specific type of advance naval base or naval air station.

Construction battalions are assigned to these units as needed.

"C" units are self-sustaining, standard advance base organizations including the components of a major all-purpose base. They contain technical shops, fully equipped, and personnel of sufficient number and training to perform voyage repairs and repair minor battle damage for a major portion of the fleet. A "C" unit's repair facilities are equivalent to a fleet repair ship, plus all special equipment usually provided by a submarine tender and a destroyer tender. Aviation facilities are furnished as requested. Normally five Construction Battalions are attached to a "C" unit with aviation facilities. The Seabees construct and maintain the "C's" roads, housing for personnel, technical buildings, water, lighting and communication systems, and other utilities and public works necessary to set up and operate the base.

A "B" unit is an assembly of equipment and trained personnel which can be used as a whole or in part to establish an advanced fuel and supply base, capable of furnishing support without repairs for a small task group of light forces. It also contains harbor defense, harbor control and operation facilities and trained personnel. Aviation facilities are furnished as desired. Normally two Seabee battalions are assigned to each "B" unit.

An "A" unit's major assignment may be the rapid construction and operation of a landplane and seaplane advance base or, in conjunction with amphibious operations, the quick repair and operation of a captured enemy airfield. It is prepared to service, rearm, and perform minor repairs and routine upkeep for the planes of one carrier group or its equivalent and one patrol plane squadron. One Seabee battalion is normally assigned to each "A" unit.

A Seabee battalion going out independently or as part of a regiment or brigade takes the following major items of material with it: self-sustaining equipment and material such as clothing, beds, bedding, infantry equipment, mess gear, and emergency rations; transportation equipment (trucks, trailers, ambulances, ponton barges); housing (either tents or huts), utilities (water systems,

electric generators, telephone systems); headquarters equipment (office equipment and supplies, medical supplies, photographic equipment, and driving gear); general hand tools and artisans' tool sets; construction equipment (rock drills and paving breakers, air compressors, concrete mixers, cranes, graders, machine shop trailers, pumps, portable rock crushing plant, rollers, carry-all scrapers, ¾-yard shovels, tractors, electric welding machines); camouflage, fire-fighting, and decontamination equipment; stock and supplies including steel bars, angles and sheets, lumber, bolts, nails, dynamite, welding rods, wire, rope, etc.; and motor fuel and lubricants.

When Construction Battalions are assigned to "B" and "C" units they receive similar additional equipment and also construction maintenance shop equipment.

The Navy has been attempting to rotate Seabee battalions in the field. After an extended tour of duty, they are returned to Camp Parks, Shoemaker, California, for reorganization and recuperation. Officers and men are usually granted a thirty days' overseas leave. When the battalion reforms, it goes through a military refresher course before reassignment. At the same time, some of the higher ratings are detached and used to form the cadre of a new battalion.

"When There's a Will, There's a Way"

AS ONE of our field artillery battalions began to pull into position south of Licodia in Sicily, the battalion executive, who led the column up, was sought out by a messenger from the battalion commander. The message directed the executive to report forward with his radio to the battalion commander on the north edge of Licodia.

The town was being pounded by artillery fire from an enemy battery emplaced north of Licodia. The battalion commander's radio had ceased to operate and he needed communications with his batteries in order to conduct fire on the enemy battery.

When the executive arrived, the battalion commander advanced on foot to the top of a high hill which was also receiving artillery fire, and from this point he relayed commands by voice through five infantrymen who were spaced along the trail on the rear slope of the hill, between the battalion commander and the executive's radio set. Through these channels the battalion commander conducted fire which not only silenced the enemy battery, but neutralized several machine-gun nests which had opened fire on him as he approached the top of the hill.

Digging Slit Trenches Saves Digging Graves

A FIELD artillery battalion commander whose battalion was engaged throughout the Tunisian campaign, stresses the effectiveness of the proper digging in of artillery units:

"My C Battery at El Guettar was well dug in. However, it was completely neutralized for one entire day by a precision adjustment on each piece. When I surveyed the damage I found that one piece had suffered a flat tire, one trailer a flat tire, and one antiaircraft 2½-ton truck had been destroyed. There were *no* casualties. On another occasion I saw two batteries of the —th Field Artillery Battalion get shelled for one entire afternoon with excellent effect from a gunnery standpoint, but only one man was killed, and he was out of his slit trench.

"Between March 29th and April 3rd at El Guettar we were attacked by enemy planes on eleven occasions. The total damage inflicted was one man killed, one wounded, and one prime mover out of action. I attribute our avoidance of casualties to proper digging in."

A Battalion Crosses the Volturno

AN infantry battalion executive in Italy tells of the crossing of the Volturno River by his battalion:

The Situation

"On 19 October 1943, elements of the —th Infantry held Alvignano (see sketch). The Germans held Dragoni. Our regiment was east of Alvignano. We were to move north, seize the bridgehead northeast of Dragoni, and establish a bridgehead north of the river, while the regiment at Alvignano was to capture Dragoni.

Battalion Mission

"This battalion was to go up the west bank of the Volturno, capture the bridge, and establish a bridgehead for the regiment.

Trouble Begins

"Soon after we crossed the road running east from Alvignano we ran into heavy machine-gun and rifle fire from enemy positions east of Dragoni. It became evident that we could not go ahead on the planned route without being engaged in a heavy fire fight and being unduly delayed; we should probably have been heavily engaged all night and still not have reached the bridge by daylight.

Reconnaissance for a Ford

"The battalion commander, therefore, sent out a patrol to the right flank with the mission of finding a fordable spot on the Volturno. (All bridges had, of course, been blown by the Germans, even the small ones over the little tributary streams. Our Ammunition and Pioneer platoon had made by-passes around these smaller bridges with stones, branches, etc., in order to move the antitank guns and vehicles forward.)

"The patrol went out to the right and reached the Volturno. After a short search they located a shallow stretch about a mile west of Scafa Numia (see sketch). The lieutenant in charge of the patrol began infiltrating men across at about twenty-five-yard intervals, but the men would get out into the stream and suddenly drop into pools over their heads.

Persistence Pays Off

"The lieutenant, however, seeing that this was the most likely looking spot, had about half the patrol cross and establish an outpost line on the east bank. Then he kept the rest of the men working to either side of the deep pools and eventually established a fordable route which looked like this:

"It was getting dark by this time, so the lieutenant took his whole patrol across as a covering force and had the ford marked with a series of willow sticks with toilet paper tied to the tops. He then stationed guides on the near bank.

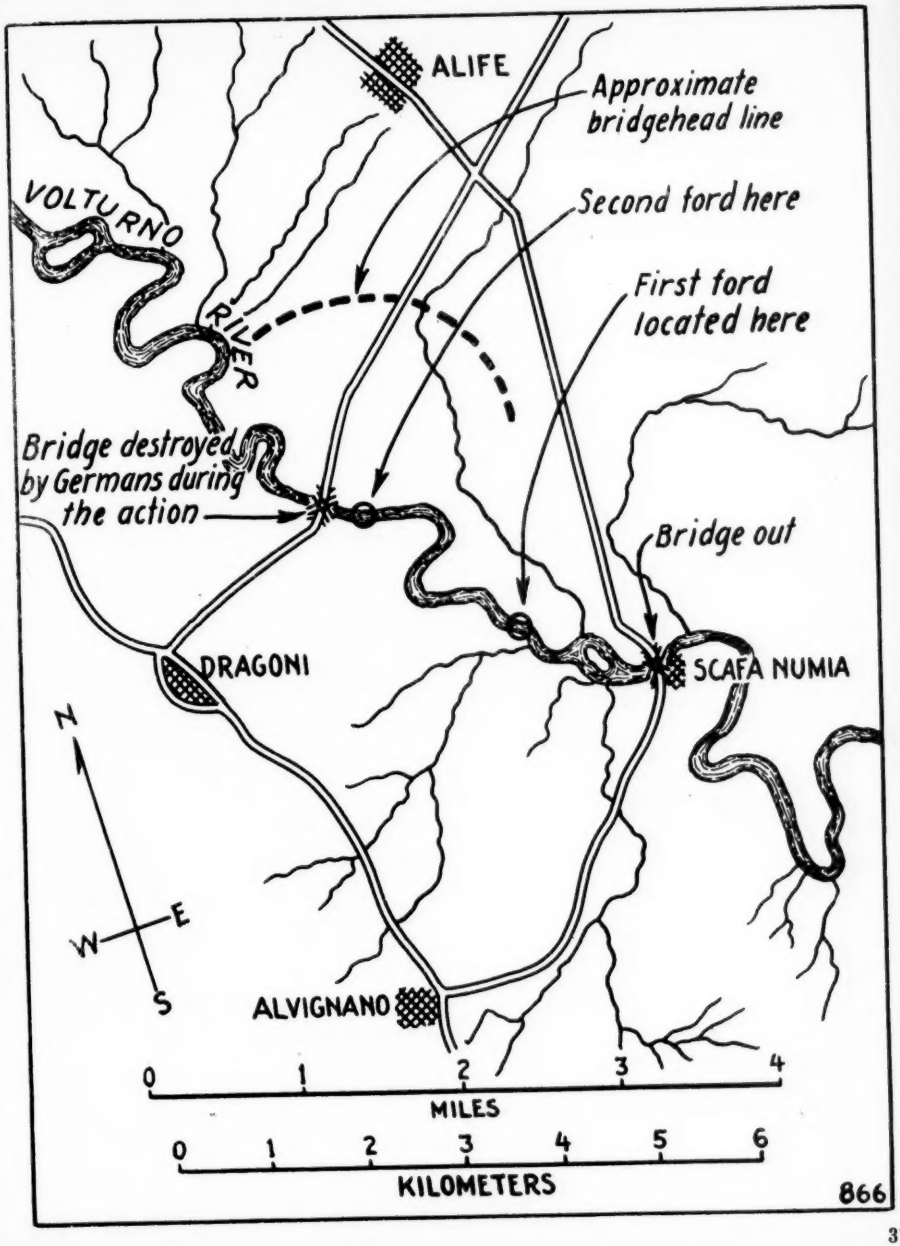
"Meanwhile, he had sent a message to the battalion commander, who under cover of darkness had disengaged the rest of the battalion and directed it to cross the Volturno where the ford had been marked.

The Battalion Crosses Under Fire

"However, there was still enough light so that the Germans picked up the movement of the battalion to the ford. They promptly brought it under artillery fire. The battalion commander ordered the men across in small groups, and the crossing was effected with only one casualty, despite the continued artillery fire.

"The battalion commander informed the regimental commander by radio as to the battalion's action, and the rest of the regiment attacked strongly along the west bank while our battalion pushed rapidly along the east bank toward our objective.

"After the foot troops of the battalion had crossed the ford, the bulk of the Ammunition and Pioneer platoon improved the ford throughout the night, so that by daylight all our antitank guns with their prime movers, our communication jeeps, and one ¾-ton truck loaded with ammunition were on the east bank. Our heavy machine guns, 81-mm mortars, and their ammunition had been hand carried.


ALIFE
Approximate bridgehead line
Second ford here
First ford located here
VOLTURNO RIVER
Bridge destroyed by Germans during the action
Bridge out
DRAGONI
SCAFA NUMIA
N
W
E
S
ALVIGNANO
0 1 2 3 4
MILES
0 1 2 3 4 5 6
KILOMETERS
866

THE GERMANS WITHDRAW

"The enemy, threatened with this flanking movement, withdrew northward across the bridge and blew it up. Our advanced patrols reached the bridgehead line (see sketch) about 0200, and the bulk of the battalion closed about 0400. Patrols were immediately dispatched to discover the new German positions.

RECONNAISSANCE CONTINUED

"As soon as the battalion reached its objective the battalion commander questioned civilians (through an interpreter) about other crossings. One stated that there was a good ford only 400 yards below the blown bridge. The battalion commander marked this on an overlay as a 'possible ford,' gave the map to a sergeant, and sent him with a patrol to contact the regimental commander, checking the ford en route.

"The sergeant found the ford, verified that it did exist and was good, and reported this information to the regimental commander together with our location.

MISSION ACCOMPLISHED

"The regimental commander, acting on this information, moved the entire regiment across the new ford at once. By daylight our bridgehead was secure against counterattack, and in the afternoon we continued the attack to the north.

"In my opinion, the key to the success of this operation was the persistence of the lieutenant who established the first ford, and the initiative of the battalion commander, who departed from the letter of his instructions to accomplish his mission and who promptly developed further information, verified it, and got it to the regimental commander in time for it to be of use."

Balloons Invade Too

From an article by A. C. H. Purthrey, *RAF*, in *Britain* (British Information Services) March 1944.

AMONG the first troops to land at Salerno during the invasion of Italy were members of the Royal Air Force and U. S. Army Balloon Barrages. Fighting was still in progress on the beach when the parties leaped ashore and landed their balloons which were already flying from the landing craft. This was at half past seven on the morning of September 9th, 1943. The job of the balloon barrage men was to keep enemy aircraft from flying in low and bombing or strafing the British and American troops as they landed. They were brought ashore by men hanging on to the cable of each balloon and were let up to operational height on winches as soon as the men had waded up the beach.

Once ashore the RAF balloon operators were only 100 yards from a German gun. One of their balloons was shot down, to be replaced almost immediately by another, and the men lay flat in the sand to take cover from mortar fire.

U. S. Army balloon barrage units were also on the Sicily invasion and American and British units are now flying their balloons side by side at one port in the Mediterranean.

There is much camaraderie between the balloon units of the two nations for the Americans have learned their job from the experience of the British and they now exchange plans and equipment. With the U. S. Army Balloon Section is an RAF Liaison Officer to facilitate the pooling of ideas.

The balloons, both mobile and static, have proved their worth in the Mediterranean. Men loading and unloading ships work with greater confidence under a balloon barrage and rightly so, for on invasions it has been officially admitted that soldiers on beaches where balloons were flying were not divebombed, while others, unprotected by the barrage, had an unpleasant time.

Passive Air Defense With Tactical Forces

COLONEL HARRY L. WHITE, *Corps of Engineers*

THE task force commander is faced with the problem of assembling his forces in the concentration area prior to movement through the marshaling areas en route to the embarkation areas.

The enemy is aware of the concentration of the forces in the several areas before they embark on the seaborne carriers, and will subject them to such aerial attack as he can bring to bear upon them through the air defense of the theater.

During the pre-embarkation period, Passive Air Defense (PAD) is covered to a very large extent by measures taken by the housekeeping forces and the civilian protection organizations. Nevertheless, the individual units have considerable responsibility for looking after themselves and fitting into the arrangements made for them. Unit and inter-unit measures will only be successful if training on the lines which I will indicate later is carried out.

As the task forces take to their seaborne transportation they leave at the port of embarkation all the PAD and CD (Civilian Defense) aid and assistance given by the several sections of the home security forces, and are now alone with their own security and that provided by the naval escort as they embark on their task mission.

During the period of sojourn on home and friendly terrain all units of the Allied task force should be absorbing the experiences learned in the technique of Passive Air Defense by planning and by the incorporating of the lessons learned into the training syllabuses of all the elements and components making up the task force.

As the great armadas and convoys enter enemy controlled waters and disembark upon enemy-occupied or enemy territory, the problem that faces the military commander is to organize his area so that reinforcements and supplies flow through to the fighting forces as rapidly as possible.

On the beaches, the defense measures to mitigate the effect of air attack or long-range shell fire consist of normal operating procedures of foxholes and sandbags for personnel protection, and the dispersal of equipment and supplies as much as is possible with the personnel available under combat conditions during the first days.

After the initial assault operation over a beach has been completed and maintenance stores begin to arrive, first-aid and fire-prevention measures will be limited to hand chemical fire extinguishers carried in the vehicles, and also sand.

Portable foam extinguishers should be landed at each cargo discharging point on the beach. The number will vary with the amount of cargo to be landed in any one given area and the transport available to carry it to the dump areas.

A bulk supply of carbon tetrachloride refill liquid and a quantity of foam recharges should be available at each discharge point. Men familiar with fire-fighting should be landed early to take care of refilling extinguishers and to supervise fire prevention measures. Shore engineers should be familiar with the operation of first-aid fire fighting equipment and extinguishers and the utilization of sand for extinguishing fires.

After landing, the tactical forces move forward, driving the enemy back. While engaged in actual assault and combat no PAD measures are possible but in tactical formations there are always large numbers of troops in staging areas, rest areas, and so on. It is when they are thus situated that PAD becomes most important.

Further, advance sections, zone of communications, are set up behind them to assure the flow of supplies, and they may be in the zone of communications or base section and other areas with an organized PAD scheme and will need to be fitted into it.

For these reasons it is essential that all are trained in PAD measures, whether they include one unit only or a number of units.

These measures, reduced to the barest essentials, are:

A center of reporting and control—usually the unit headquarters.

XUM

Instruction on reporting.
Incident control.
Arrangements to deal with casualties and damage.

The application of PAD will vary with the situation. In tactical forces in the field under combat conditions, PAD consists of normal security measures. Added PAD measures must be taken when units are bivouacked or quartered in or near towns and cities.

The normal security measures constituted include such matters as:

Blackouts and dimouts.
Personnel protection.
Air raid warning.
Fire prevention.
War gases.
First aid.

The subject matter of normal security measures is covered in War Department publications. Further reference must be made to pertinent publications issued in the theater of operations concerned.

The added PAD measures which must be taken when tactical units are bivouacked in towns and cities are:

1. Large organizations may be required to establish a PAD control center similar to that set up in base sections.

2. Smaller organizations such as regiments and battalions may establish a regimental or battalion PAD control center.

A control center should be established at battalion level to dispatch PAD services such as light rescue squads to units which need assistance.

At regimental level there should be a control center to coordinate the battalions. For example: if a battalion bivouac, barracks, or supply area has received a heavy bombing, it may be necessary to call on adjoining units for PAD services. This would be handled through a regimental control center. Also, since some battalions may not be self-sufficient they may find it necessary to call on adjoining units for assistance. This will be directed through regimental control center.

The function of PAD officers at all levels of the tactical forces are:

a. Advise the commander on matters pertaining to PAD organizations, operation, and training.
b. Advise in the preparation of training and operational directives for subordinate units.
c. Be available to aid in the establishment of control centers within units, working through normal command channels, and to provide operational control for PAD services and coordinate other services.
d. Train part-time PAD officers of lower echelon in PAD organizations and functions.
e. Make periodic inspections and, when possible, have practice exercises to determine the adequacy of PAD equipment and training in the units.
f. Consolidate data received of air raid damage from subordinate units, such as type and size of bombs dropped, their number, general damage caused, casualties, etc.
g. Establish and maintain liaison with the Civil Defense Officer of Civil Affairs Section in occupied enemy territory and through the Liaison Section in occupied friendly or co-belligerent territory.

In rear military areas of corps and divisions adjoining cities, mutual assistance arrangements with civil defense organizations will be established. When Civil Affairs is functioning in the city, liaison will be established with the Civil Defense Adviser of the Civil Affairs so as to arrange such mutual assistance posts. If Civil Affairs is not operating in such city, liaison will be direct with the head of the civilian defense organization.

PAD organizational and functional plan for regiments, battalions, and companies will include PAD services organized from existing personnel and equipment such as:

Fire watchers.
Incendiary bomb details.
Light rescue squads.
Heavy rescue squads.
Ambulance available to PAD control during raid (arranged through Medical Corps).

Medical aid posts (as set up by Medical Corps).

Where dumps for several services are located in the same vicinity, a central control will be established by the commanding officer of the unit with an officer designated by roster as control officer in charge during air raids. At this control (location may be headquarters, command post, or headquarters of the engineer fire fighting platoon) will be a list of the PAD equipment for each dump or depot. The control will have a telephone if possible, damage report forms, and a map of the area indicating PAD facilities and military structures, dumps, and roads. It will be manned at all times by at least one person acquainted with its operation. Upon receipt of an alert, guns firing or bombs dropping, the control officer will proceed at once to the control. During a raid, control should be manned by two or more runners.

In rear areas, companies or similar units operating dumps or depots and headquarters and troops housed in permanent structures should have a designated location to exercise control of PAD measures during air attacks (e.g., company headquarters or command post):

a. The suggested control group to consist of the officer of the day or the commanding officer, PAD officer or NCO of the unit (if one has been designated), runners, and a clerk for the telephone.

b. Equipment: Telephone (if available), damage report forms (Immediate Report and Survey Report), and map or sketch of area indicating PAD facilities, structures, dumps, and roads.

Air raid damages will be reported by fire watchers. The company PAD control then dispatches what assistance it has in the company. In the event of the company PAD services not being able to handle the incident, assistance will be requested of a higher echelon, and complete information as possible furnished at the time.

The PAD officer or NCO of the company should know the following and see that company troops are familiar with them:

1. Standard Operating Procedure relative to unexploded bombs.

2. SOP rules and regulations pertinent to fire prevention.

3. Air raid warning signals.

The PAD officer or NCO of the company should:

1. Be familiar with medical officer's plan for the handling of casualties.

2. Make arrangements through gas NCO for assistance in the event the enemy uses gas.

Fire watchers will be provided by companies and similar units at dumps, depots, and bivouac areas (to be located at points where they can see or hear bombs land).

Fire watchers (preferably working in pairs, one to serve as a runner) will immediately call "incendiary bomb details" when bombs fall. Sentries will have fire watching included in their orders and thus will act as fire watchers. Engineer fire fighting platoon, if available, will be called directly by fire watchers when needed. When other assistance is required the runner will call or go to PAD control from which the control officer will dispatch the necessary services.

Incendiary bomb details will be provided by companies and similar units in rear area dumps, depots, and bivouac areas. Each incendiary bomb detail to consist of three men, the ranking enlisted man being designated as leader. Each group of six details will be in the charge of an NCO. Details will be designated on a duty roster. When called by the fire watcher these details will immediately report to their stations and go into operation as needed, using fire fighting equipment available such as stirrup pumps, sand, extinguishers, etc. Stirrup pumps being available, this detail will operate as follows:

One man handle the hose, one operate the pump, and the third carry water.

When fires occur which are beyond the scope of the incendiary bomb detail, the engineer fire fighting platoon will be called immediately.

Fire watcher and incendiary bomb detail training will be given every soldier, as a part

of PAD training. This training will include:

a. Use of stirrup pumps, pump cans, sand, and extinguishers.

b. Location of emergency water supply.

c. Study of incendiaries and their applications with emphasis on identification of enemy incendiaries.

Companies or similar units will have available two light rescue squads; similar units of fifty men over one light rescue squad.

a. Each squad will consist of an NCO and six enlisted men, one to be a medical aid man. These men will be detailed according to a duty roster but will only stand by, in the event of an alert or attack.

The function of light rescue squads will be the removal of casualties from demolished structures where technical engineering skill is not required. These squads will be prepared to deal primarily with casualties of their own unit, but may be subject to the call of battalion control or higher echelon control, in the event they are needed in other areas.

Light rescue squad training for all troops will include the following subject matter:

1. Action on alarms and call out.

2. Reconnaissance and leadership at incidents.

3. Appreciation of damage to buildings.

4. Rescue by debris clearance.

5. Recovery of the dead.

6. Damage to utilities.

7. Rescue in presence of poison gas.

8. Team training.

a. Frequent incident drills will be held to check on state of training of parties.

b. The light rescue squad will be prepared to render first aid.

In areas where personnel are housed in permanent structures of two or more stories, heavy rescue squads will be organized by suitable engineer units in the area.

In General

Military operations which involve the occupation of areas including cities or ports are affected by the extent and efficiency of Passive Air Defense, Civil Defense, and fire defense measures.

Proper and effective measures will facilitate military operations in occupied territory. Inadequate measures can seriously impede them.

Rapid unloading of ships and dispersal of quantities of stores, equipment, and personnel is a big undertaking. If he is attacked in the initial stages of this operation by air bombardment or long-range gunfire, or if delayed-action mines, placed by the enemy before leaving, blow up important roads and buildings, the commander and his staff will be faced by two major problems—first, dealing with the immediate results of the attack; second, continuing with the organization of the port base, which is of paramount importance.

In the light of experience in North Africa, Sicily, and southern Italy, we now provide the commander with an additional operations officer to plan beforehand, to set up without delay and to operate an organization receiving, through a report center, authentic information of incidents caused by bomb, shell, or delayed action mine, and to initiate such action as is necessary to deal with the incident or incidents.

This operations officer we call the "PAD Staff Officer" or "PAD Controller," and he works as one of the operations staff.

He is responsible for drawing up the necessary PAD plans beforehand, and for coordinating with them the fire-fighting plans and plans for recruiting and mobilizing any civil defense or civil fire brigades which may be available.

He also insures that military units and base installations have instructions beforehand of what they should do in certain eventualities, and that "interim orders" are given to them as they arrive in the port or base, telling them how and where to report air raid damage, etc.

He has a small PAD staff so that his report center can be manned by day and by night from the time it is set up—which should be within an hour or so of the arrival of the advance party of the headquarters staff in

the occupied port or base. All incidents are reported to the PAD report center, and the PAD Controller informs and initiates action by any services which are required to deal with them, e.g., engineers, medical staff, provost, fire brigades, bomb disposal and rescue and working parties provided by units quartered in and around the port.

The purpose of Passive Air Defense is to mitigate, as far as possible, the effects of enemy action such as those caused by air attacks, bombardments, delayed action mines, and booby traps, on personnel, stores, and equipment in order that the dislocation of the normal functions of area is reduced to a minimum.

It does not include passive measures such as barrage balloons, smoke coverage camouflage, etc., whose mission is to harass and prevent effective enemy action. The latter measures are a part of the active air defense.

Passive Air Defense will not stop the bombs falling or exploding; it can and will mitigate their effects.

It may completely annul the effects of a bomb exploding; it may merely reduce them, but it will reduce the damage and dislocation of a port or base on a depot or a camp.

Basic principles of measures to deal with the effects of air raids are the same whether they are

1. The complex system of civil defense as built up in Great Britain and the United States.

2. The less complex but complete system in a well organized base port.

3. The still simpler inter-unit organization in a large garrison or encampment area.

4. The very simple unit measures applied to a single unit away from the fighting zone.

Importance of G-2 Functions

A SENIOR U. S. commander, who recently visited the Italian front to observe the organization and operation of the staff sections of higher echelons, had this to say about G-2 functions in the Italian theater:

"I was greatly impressed by the wide scope and variety of G-2 activities in the search for enemy information. The vital importance of these activities in the theaters of operation brought forcibly to my attention the need for added vigorous training of G-2 sections and their attached agencies within the continental United States prior to departure for active operations.

"One of the most significant features of G-2 functioning was the large number of attached specialists operating under G-2 control or through cooperation with G-2. These include counterintelligence personnel, representatives of the Office of Strategic Services, British intelligence agents, specially trained order of battle personnel, field press censors, public relations officers, prisoner of war interrogators, translators and interpreters, air photo interpreting teams, statisticians, draftsmen, and map experts. The coordinated efforts of these experts and specialists produce a large and valuable flow of enemy information.

"It is essential that this section be controlled and coordinated to the fullest extent in order to operate smoothly and efficiently and to maintain a constant flow of information. The mass of information collected by the many agencies of G-2, after being carefully collated, evaluated, and interpreted, must be transmitted as intelligence to higher, subordinate, and neighboring units in ample time to be of use. I was impressed with the amount of work that must be constantly carried on to obtain the necessary amount of so-called 'long-range information' to permit the commander and his staff to plan future operations. I am of the opinion that too much emphasis cannot be placed on the training for combat of our G-2 sections during each training period."

XUM

Supply Planning

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TOO many commanders, supply planning presents a very dull picture. The operation of the "4" section of his staff is not as glamorous and interesting as that of the "3" section. However, the soundness of the plans of his G-4 are of great importance. They may spell the difference between victory and defeat.

Clausewitz, the authority on whom many military writers lean for support, states, "The provisioning of troops is a necessary condition of warfare and this has great influence on the operations."

Recognition of the importance of supply, however, goes back beyond Clausewitz. Sun Tzu wrote *The Art of War* about 500 BC. It is probably the oldest military writing in the world. He says, "An army without its baggage is lost, without provisions it is lost, without bases of supply it is lost."

So if our commander is to be successful, his supply planning must parallel his strategical and tactical planning. In fact, it is really a part of this planning, because unless his supply plan indicates the proper logistical support for the operation, strategical and tactical plans must be modified to the limitations dictated by the supply plan.

FM 100-10, Field Service Regulations, Administration, contains the fundamentals on which supply planning and operation in the United States Army are based. The introduction to this manual contains the following paragraph:

"The two fields—operations and administration—into which military activity is divided are obviously interlocking. They are separated in Field Service Regulations only for convenience of discussion. It is the function of command to unite the strategical or tactical plan and the administrative plan into a harmonious whole."

Considering supply planning from a broad viewpoint, it embraces:

1. Supply.
2. Maintenance.
3. Evacuation.
4. Construction.
5. Transportation.

Our supply plan must make provision for all of these factors.

Supply itself embraces the function of placing at the commander's disposal in proper quantities, at the proper place, and at the proper time, all that he requires for the maintenance of his force. This resolves into four major phases:

1. Procurement.
2. Transportation.
3. Storage.
4. Issue.

In the first place the supplies must be obtained. This may only involve shipment from a depot, or it may possibly involve manufacture.

Secondly, the supplies must be transported to the proper place. In present-day global warfare this may be a major problem involving shipment over many thousands of miles.

In the third place, after the supplies reach their destination, they must be stored until the commander is ready to use them and calls for them.

The problem of supply planning also divides itself into two additional phases with respect to time;

1. Initial supply.
2. Maintenance supply.

Initial supply involves that required for the initial equipment of a force. All of the supplies and equipment required must be available, and sufficient transportation must be available to carry the force with its supplies and equipment to its destination.

Maintenance supply is a continuing process as long as the force is in operation. Supplies must be procured, transported to the destination, and then kept in storage until the troops need them. The greater the distance they must be transported the more important the storage factor becomes, as reserves must be built up in echelon to allow for transportation delays and failures.

Before a supply plan can be prepared certain basic data are required:

1. Detailed concept of the tactical plan.
2. Combat troop basis.
3. Logistical study of the area involved.

Supply planning is so dependent upon the tactical plan that the supply planning agency must be acquainted with the detailed concept of this plan. All are familiar with the necessity of close cooperation between G-3 and G-4 on the division staff. This is just as important on higher staff levels. The tactical plan will affect the type and quantity of supplies required, it will affect the number and type of service troops, it will affect the time element of supply and transportation. The tactical plan may require that some special equipment be employed.

Information regarding the combat troop basis is essential. The supply planner must know how many and what type of combat troops will be engaged. He must know how many men he has to feed. He must know the weapons with which the troops are equipped so that he can plan for the correct ammunition and maintenance supply.

Data regarding the area in which the operation is to take place are also important. The local conditions may have considerable bearing on the supply plan. These data should at least include:

a. Port capacities.
  (1) Berthing capacity.
  (2) Harbor depths.
  (3) Ship repair facilities.
  (4) Tonnage handling capabilities.

b. Transportation situation.
  (1) Gauge, capacity, and extent of rail lines.
  (2) Capacity and extent of road net.

c. Water supply.

d. Availability of local labor.

e. Warehouse and storage space.

f. Availability of local construction material.

g. Resources capable of exploitation.

With these basic data the supply planner can proceed with his work. His plan must give an affirmative answer to each of the following questions:

1. Can the force be initially equipped?
2. Can the force be transported to its destination?
3. Can the force be maintained after arrival?

With three "yesses" the supply planner can go to his commander and say, "The proposed operation can be supported." Unless a commander gets such assurance from his "4" section the most brilliant strategical and tactical plans produced by his "3" section may fail.

So no matter how dull and uninteresting a commander considers supply planning, he must look upon it as an integral part of his plan for an operation if he hopes to go down in history as a successful military commander.

Flexible Supply Plan Necessary

A senior commander commented as follows on the supply conditions in Italy:

"Supply plans and methods used, while conforming to the principles set forth in Field Manual 100-10, are very elastic and flexible. Much ingenuity and improvisation are required and demonstrated by supply personnel of all echelons, particularly in overcoming transportation difficulties. All means of transportation—rail, motor, water, and pack—are used. Railheads and truckheads for supply are established whenever possible. For front-line troops, however, it is necessary in most cases to establish supply dumps as close to these units as possible and move them forward as the tactical situation permits. Levels of supply in these dumps vary directly with the transportation problem. The more difficult the movement of supplies, the higher the level of supply."

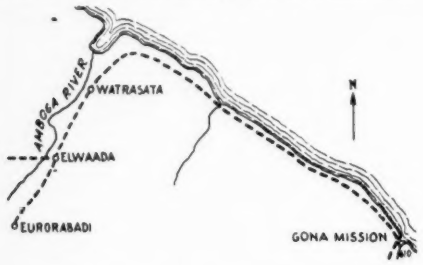
XUM

A Long-range Combat and Reconnaissance Patrol in New Guinea

(From an Official Report)

THE Japanese were known to be escaping from the Sanananda area by infiltrating west past the Gona road. The enemy was believed to be heading for some assembly area to the northwest.

On battalion order a patrol of twenty men, including two cooks and one aid man, was formed. The primary mission of this patrol was to destroy all enemy groups it encountered in the area between Gona and Elwaada. As a reconnaissance patrol it was to reach Elwaada and explore the surrounding territory for fresh signs of Jap activity.



The route to be followed was Gona—Amboga River mouth—Watrasata and then by government track to Elwaada. See sketch for route.

The patrol leader selected the men. The uniform consisted of the dyed green herringbone fatigue suits, combat packs with shelter halves added, steel helmets, headnets, and gloves. The cooks carried three small billycans. The patrol carried four tommy guns, two BAR's, and fifteen M1's, with ninety-six rounds of ammunition for each M1, one hundred-seventy rounds for each tommy gun, and two hundred rounds for each BAR. Each member carried two Australian hand grenades. The patrol carried two rations per man for an estimated five meals. In addition some men carried the flat Australian emergency ration. Each two men carried an entrenching tool, usually a shovel as there was very little use for the pick in the porous soil.

The patrol was duly inspected by the patrol leader, and after having had a hot lunch left the company command post at 1130 hours. This early start was taken so that the patrol would reach its initial march objective in time to feed and form a small defensive perimeter before dark.

On the narrow jungle trails the patrol advanced in single file. A point of three men, with five yards interval between men, was as far ahead of the main body as the visibility would permit, usually about fifteen yards. The main body followed with an interval of five yards between men. The rear guard consisted of two men following the main body at about fifteen to twenty yards. While on the move alternate men watched alternate sides of the track. Talking was prohibited. The rear man of the three-man point frequently looked back to the patrol leader for visual signals. The main body carried their weapons slung, the members of the point kept theirs in the port position. When encountering terrain obstacles (swamps, unstable bridges, etc.) the members of the patrol crossed singly and waited on the other side to reform with the remainder of the patrol.

Upon nearing Watrasata at 1400 hours, the point heard Japanese voices. Although the point was screened by tall Kunai grass, it advanced cautiously and saw Japs walking about, talking, and apparently unaware of there being any Americans within miles. There was no guard posted at or near the entrance to the village. Five Jap stragglers were easily surprised and killed. Native fruits and vegetables were found in their packs. The patrol continued on its way and reached Elwaada at 1630 hours. Thus the march lasted only five hours instead of the estimated nine. The point went forward to investigate the village. As the approach near the village widened to about fifteen feet the point moved cautiously on either side of the track. The men spotted two Japs at the far end of the village at a distance of about 125 yards. This fact was reported to the lieutenant and, sus-

pecting an enemy ambush, the patrol leader decided to envelop and attack the flank and rear of the village. The point killed the two Japs. The patrol then moved into the village from the wooded flank, investigated the six native huts, and found them to be free of all enemy. The patrol leader immediately set the two cooks to work preparing the evening meal, and then sent out small groups to reconnoiter the southern approaches to the village. Finding nothing, these groups returned and the patrol formed an all-around defensive perimeter in the center of the village. Had the patrol occupied the huts which were on the very edge of the village it would not have been able to cover the approaches of the village with automatic fire and could have been easily approached by the enemy from the surrounding jungle. By 1800 hours preparations for the night were completed. The men then ate supper. At this time several natives entered the village and the lieutenant made friends with them. One native, a mission boy, promised to return the next day and lead patrols to the nearby native gardens and to Eurorabadi. Soon two natives came running into the village shouting that there were two Japs in their garden, about ten minutes march north of Elwaada. The patrol leader dispatched a five-man patrol that made short work of the enemy. One half of the patrol was alerted and the night passed without further incident.

The following day the natives guided patrols to Eurorabadi and toward Bareda. Three Japs were killed on the trails. The patrols saw evidence of pilferage, but found no indications of large numbers of enemy passing through this section. Total Japs killed—twelve. The following day the patrol made an uneventful march back to battalion headquarters.

Your Watch as a Maintenance Problem

Prepared for the MILITARY REVIEW under the direction of the Director, Maintenance Division, Army Service Forces.

ISSUE wrist and pocket watches appear to present the latest preventive maintenance headache, according to field reports reaching Maintenance Division, ASF. In the words of an official communication, here is what is happening to wrist watches in an area believed large enough to present a significant picture:

1. Brackets for wrist bands broken, and in some instances one or both brackets missing from the watch case.

2. Marks and scratches on watch cases indicating either tampering by the user or careless work by maintenance personnel.

3. Watches which have been cannibalized for certain parts by field maintenance personnel arrive at arsenals in various stages of disassembly and occasionally the movements are damaged by careless assembly into the case.

4. Among the later type waterproof watches received at ———— for repairs there was evidence that pliers or some similar tool had been used in an attempt to remove the back of the case which is screwed tightly into place and designed for the use of a special holding device and box wrench for disassembly and assembly.

As for pocket watches, they are being treated the same as wrist watches in paragraphs *2* and *3*. In addition there are reported damages to dials and hands indicating watches have been carried in pockets unprotected after crystals were broken.

Thus to the multitude of preventive maintenance cares now shouldered by responsible personnel there must now be added watches, apparently because they are subject to abuses which, in the absence of additional detail, remind one of boys in short pants.

XUM

Recovery, Evacuation, and Salvage in the Combat Zone

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THE purpose of this article is to discuss the fundamentals of recovery, evacuation, and salvage of captured, damaged, and unserviceable material in the combat zone.

The basic thought involved in these three functions is *conservation.* Why is conservation so important? Why must the fighting soldier continually be taking time out for picking up junk? Why must we provide service personnel for this purpose when manpower is already short?

There is no one answer to these questions. Rather, the answer is a combination of several factors—each most important in itself. One of these factors is the necessity of conserving raw materials. When the Japs took over the South Pacific and the Germans restricted our traffic with other areas, our raw materials situation was greatly aggravated. We found ourselves short of rubber, tin, and many other materials vital to the production of the implements of war. In many cases, we have been forced to depend upon our own continental resources. In other cases, it has been necessary to develop completely new sources. Although the problem is being solved, there is no question about its serious effect upon our capacity to wage modern war. Conservation of national resources is of vital importance.

The second of the factors is the transportation situation. Though the submarine menace seems to have been surmounted, and even though our ship production has reached astronomical proportions, our supply lines are still so extended that there is always a shortage of shipping space. Shipping space must be conserved.

Another factor is our commitments to our allies. In order that they may continue to fight, we must provide them with guns and ammunition, tanks, and supplies of all kinds. Still another drain on the available supply.

The problems of manufacturing these implements of war hardly deserve mention, nor does the cost, for we seem to have the manufacturing problems well in hand. These problems are small compared to the others mentioned. All of the factors, however, add up to the fact that it is extremely difficult to get the fighting tools of this war to the combat soldiers, and therefore those tools which have already reached the front should be conserved to the maximum possible extent.

The conservation, or salvage, discipline of the United States soldier is notoriously poor. For an example, we need go no further back than the 1941 Louisiana maneuvers. There was one armored division which left behind, *lost* in the maneuver area, nine complete light tanks. Eighteen tank engines also disappeared due to cannibalization and faulty reports.

Another example can be found in the North African campaign. Observers report that a large part of North Africa was covered with abandoned, burnt out, discarded tanks, vehicles, guns, ammunition, and equipment of all types long after the fighting stopped. Much of that damaged equipment had nothing but junk value, and that value did not justify collecting the junk and transporting it all the way back to Detroit. A lot of it, however, could have been recovered, repaired, and used again if sufficient emphasis had been placed upon the subject of conservation at the time.

Still another example is the present situation in Italy. Take a simple item: gasoline cans. Our truck and tank drivers have a tendency to fill their tanks and then toss the cans away. It is only a slight exaggeration to say that almost every family in southern Italy has one or more U.S. gas cans which they have picked up. A gas can may seem a small item, but when the number of cans runs into the millions, it becomes of the greatest importance.

Now conservation and economy are two terms we are greatly concerned with during peace times. Too few realized then, or realize now, that this had a real training value. The troops must be trained to economize, to take care of their equipment, and to see that every-

thing possible is recovered and repaired or salvaged.

Remember, everything is of value in warfare; nothing must be wilfully destroyed unless in danger of falling into enemy hands, and loss through negligence is inexcusable at any time. That is the first major point of this thesis. Every officer should remember the absolute necessity of making himself and his troops "conservation conscious."

Let us define and discuss some of the terms used in connection with these activities.

What is meant by the term *recovery* as applied to matériel?

1. Battlefield recovery is a function of the combat units (supplemented as necessary by service personnel). The idea is to restore equipment to usefulness immediately and, if this is impossible, to make it available to higher echelon.

2. It involves the movement of matériel to defilade, axis of evacuation, or a designated establishment, where it can either be repaired by unit personnel or made available to evacuation personnel.

3. Recovered matériel should be turned over to the responsible service with minimum delay.

4. The term "recovery" covers all classes of matériel.

What is meant by the term *evacuation* as applied to matériel?

1. Evacuation is handled by service troops.

2. It involves the transportation of matériel from collecting points established by the units to installations farther to the rear. In some cases evacuation of heavy equipment from the forward part of the division area can be performed better by higher echelon than by the division service. In such cases, evacuation activities are coordinated by the division ordnance officer.

3. It will be accomplished by any means available; in the case of heavy matériel, evacuation will be carried out by units with equipment designed for that purpose. One such special unit is the ordnance evacuation company.

Remember that service units may often help the combat units in recovery, and that combat units may sometimes assume evacuation functions; every agency should do its utmost to get the job done.

In order to clarify the subject of recovery and evacuation, it is helpful to think of two channels in which these functions take place. These are the *maintenance channel,* and the *salvage channel.* (British readers please note that the term *maintenance* is used to mean *only repair.*)

Before proceeding, it is necessary to note that there is no sharp line of demarkation between these two channels. There will be frequent overlapping. As arbitrary distinctions are established, remember that this is done for the purposes of study and for guidance in the field, and that there will always be exceptions. Remember, also, that recovery, evacuation, and salvage are inseparable from maintenance and supply. In most cases the channels of recovery, etc., are just the channels of supply in reverse. We try to maintain equipment so as to keep it operating and thus minimize resupply problems. For the same reason, we try to repair damaged equipment and return it to service as near its point of use as possible.

The *maintenance channel,* as distinguished from the salvage channel, applies to recovery and evacuation by *maintenance personnel* of major items—tanks, vehicles, artillery, etc.

The *salvage channel,* as distinguished from the maintenance channel, applies to recovery and evacuation by *all troops* other than maintenance personnel, and to all other clothing, equipment (principally light items), and other matériel.

The majority of the matériel which we think of as flowing through the maintenance channel is ordnance equipment; vehicles, tanks, artillery pieces, weapons, etc., but we must not forget that other types of equipment are also involved. Signal, chemical warfare, and other specialized matériel must be considered and definite provisions made for its handling. The salvage channel is the maintenance channel for quartermaster equipment.

Matériel flowing in this channel is usually collected, or reported, by unit (1st and 2d

echelon) maintenance personnel. If unit maintenance service is unable to handle the repair job, the item is either evacuated back to an ordnance collecting point, or the ordnance service is requested to come forward and pick it up. Repair work, reissue, or evacuation will be carried out by the first agency (lowest echelon of maintenance) which is able to handle the job.

It is necessary to point out a decided difference in the capabilities of infantry and armored units with respect to recovery and evacuation. Let us first consider the infantry division. The infantry regiments have no wreckers or other means of evacuating heavy matériel, and division artillery has only one four-ton wrecker. The ordnance light maintenance company of the infantry division has two four-ton wreckers and one heavy wrecker. It is obvious that the division's capabilities for recovery and evacuation of heavy matériel are extremely limited. In both infantry and artillery components, the unit is usually unable either to recover or to evacuate heavy matériel and must call on the division ordnance service to come forward and take care of the job. Frequently, because of its limited equipment, the ordnance company will be unable to comply, and must call on higher echelon to send forward into the division area and evacuate the item. When this is done, careful coordination by the division ordnance officer is necessary.

Light matériel may be handled in any one of a number of ways, or some combination thereof. Units may establish collecting points, although this will not be normal. Unit personnel would, in this case, recover the matériel and that which could not be repaired within the unit would be moved to the collecting point. It would be picked up there by personnel of the ordnance maintenance company.

A more likely procedure would be the establishment of a collecting point by the division ordnance officer. It is often desirable to put the collecting point at the division maintenance shop. Collecting points may be established at the ammunition supply point and the Class I supply point, so that trucks going to the rear for supplies may carry back damaged matériel. Equipment may be dropped at the division ammunition office, and picked up there by the division ordnance company. At such collecting points, the ordnance service takes over. Other services, and arms having service functions, must maintain liaison with the collecting point in order to take care of any of their equipment which may be brought back.

In any case, if a unit needs immediate replacement of some item of equipment, a call to the supporting ordnance service will bring forward a replacement item, the damaged one being evacuated in exchange.

The capabilities of the armored division for this type of activity are much greater than those of the infantry division. For example, the tank battalion has two heavy wreckers and six forty-ton tank recovery vehicles. Obviously, the tank battalion is able to handle a great deal of its own recovery and some evacuation to the division ordnance shop. With this capability, it is normal for the tank battalion to establish a collecting point, frequently at the unit service area, evacuation from which is handled by the division ordnance service. The ordnance maintenance battalion of the armored division is equipped with eleven heavy wreckers and nine tank transporters. It is thus able to assist the combat units in recovery of heavy equipment plus performing its function of evacuation back to the ordnance shop area.

Within the armored division, the handling of light equipment, small arms, etc., is very similar to the procedure in the infantry division.

Let us now leave the *maintenance channel* and discuss the *salvage channel*. It is separate from the maintenance channel. What is salvage?

Salvage is anything abandoned in the theater of war. There is no other distinction. The word salvage comes from the Latin word meaning "to save." Remember, it is the military value, the problem of replacement, that counts.

The initial responsibility for the collection of salvage lies with the combat units. Effective

salvage operations on this level depend solely upon proper salvage discipline. Each individual must be constantly on the lookout for salvage of all kinds. There must be a continuous search of the battle area. Salvage items must be collected and evacuated back to unit collecting points. This activity is coordinated and directed by the *division salvage officer*, who is appointed by the division quartermaster.

The *division salvage officer* is first concerned with indoctrination of all personnel with the necessity for proper salvage discipline. Once this has been achieved, and units are properly collecting salvage, he must develop plans for, and supervise, the evacuation of matériel collected to salvage collecting points in the rear areas. He must see that salvage is sent to the rear by every available means; prisoners, vehicles going to the rear for supplies, and so forth. Arms and equipment accompanying personnel casualties are collected by salvage authorities at medical establishments. The salvage officer must see that salvage collecting points are established near supply points, railheads, truckheads, etc., in order that empty supply vehicles heading for the rear can be filled with salvage and can transport this salvage back—without unnecessary travel looking for a place to dispose of it and a consequent loss of time and gasoline.

Rear area salvage collecting points are operated by quartermaster salvage organizations. They are charged with collection, sorting, and general handling. In addition, they have the job of organized salvage collection, of evacuating scattered collecting points, and of clearing up the battlefield after the troops have moved on. The quartermaster has salvage collecting companies and semi-mobile repair battalions for the accomplishment of this mission. A standard salvage battalion, to consist of an ordnance battalion, headquarters, ordnance evacuation company, and ordnance maintenace companies, quartermaster salvage companies, and quartermaster salvage repair companies as required, is now being considered. The entire responsibility for salvage activities would be centered in this unit.

Much equipment which is repairable will be collected as salvage. This equipment should be returned to maintenance channels with a minimum loss of time and at the lowest possible echelon. Specialists from other services—ordnance, signal, engineer, and others—will be attached to the quartermaster organizations in order to see that such equipment is properly handled. As stated above, the salvage channel is the maintenance channel for quartermaster matériel.

So far we have not mentioned *captured matériel*. Let us consider this phase of our subject.

From captured matériel, by studying its capabilities, counterweapons and countertactics are developed. A very obvious example is that when enemy use of a tank with more or superior armor is discovered, an antitank weapon with punch enough to penetrate that armor must be developed.

It is often possible to pick up useful ideas. These may consist of new devices or simply new technical twists to old ones.

We can gauge the state of enemy resources for war. For example, there is now operating a very active Ordnance Intelligence Section.

It is necessary to study the operation of enemy matériel in order to prepare our own troops to use captured equipment. Such use involves information on how to operate the particular weapon, ammunition, spare parts and tools required, etc.

In general, combat personnel will capture enemy matériel or encounter it first. Anything which appears to be of new design will be reported through command and maintenance channels, and started back through normal recovery channels. The matériel must be evacuated properly; therefore ordnance equipment is handled through ordnance channels, signal equipment through signal channels, etc. Brief reports are made by the interested special staff officer on each level to the S-2 or G-2. The theater special staff officer is charged with preparing a preliminary training guide, and with sending at least one com-

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plete sample of the item back to the United States for test.

The various forms and check lists prescribed by our Field Manuals give very clear evidence of the neglect which the subjects of recovery, evacuation, and salvage have received. For example, see the forms for a complete written Administrative Order, and the G-4 Periodic Report, in FM 101-5 (SOFM, The Staff and Combat Orders). In order to remedy this defect, it is necessary that every officer and man be indoctrinated with the idea of *conservation* and that all staff officers constantly emphasize the point and provide necessary coordination and guidance.

The impetus of supply is from the rear. There is no impetus of salvage; as a matter of fact, it must go back against the flow of supplies. The only impetus that can be achieved is the individual effort of every officer and man.

Road Maintenance by Combat Engineers

THE official records of the —th Combat Engineers in Tunisia provide an interesting glance behind the scenes at some of the back-breaking labor that went into the preparations for our successful operations. The following excerpts are typical:

"Company C, with one platoon of Company B attached, moved on March 10th to a bivouac twenty-five miles east of Thelepte with the mission of constructing the one-way dry-weather road between Thelepte and Selissa (on the Sbeitla-Gafsa road) a distance of thirty-nine miles. A rough road existed from Thelepte to a point fifteen miles to the east. The existing road was to be improved, and the remaining twenty-four miles was to be constructed in two days. The company had available two D-7 bulldozers, two R-4's, and two graders. At noon of the second day the one-way road was completed, and portions of the road had been widened to two-way. The following day the remainder of the road was made two-way. The road was maintained and improved until the night of March 16th, when the entire 1st Armored Division and attached combat units began to move over the road to the attack. Heavy rains had begun, and the entire company was required to work all night on maintenance and repair. However, the column was not held up at any point.

"Meanwhile Company B moved on March 13th to Kasserine Pass to improve the Kasserine-Bekkaria road, eight miles northwest of the Kasserine-Thala junction. This road had been only a camel trail until road construction was undertaken by the engineers. Now, because of heavy rains, it was one long mud hole and was almost impassable. Company B worked three days improving the road prior to the 1st Armored Division offensive. In one stretch of road, over 500 cubic yards of rock were loaded by hand and placed on the road.

"The entire 1st Armored Division moved over this road at night in launching their attack. It rained almost constantly during the move. Company D and one platoon of Company E were called on to support Company B. The men worked unceasingly for forty-eight hours with all available equipment to keep the column moving. D-7 angle dozers were used for pulling large vehicles out of the mud; even tanks got stuck, but the column got through.

"On March 25 Company E started construction of a 'shoo-fly' around the railroad bridge four miles northeast of Kasserine, which had been wrecked by Company A on February 17 during our withdrawal. The Germans had completed the demolition. In nine days the company constructed four large timber culverts eighty-four feet long, laid 5,600 feet of track, excavated 7,030 cubic yards, and filled 17,800 cubic yards."

The Battle of Dieppe from the Air

WING COMMANDER RAYMOND H. HARRIES, *DSO, DFC, RAF*

ALTHOUGH the Dieppe operation took place nearly two years ago, it may be that some people would be interested in hearing about the battle from the air point of view, seeing that we are perhaps on the verge of yet another military operation against the Western Front.

It was easy to tell that something was "in the air" because two weeks prior to the commando landing on Dieppe word came round to our airfield that our aircraft were to be used as little as possible and operations kept down to a minimum.

On the eve of the battle all air crew personnel were instructed to report to the large briefing hut. In an air of great anticipation all the pilots assembled, and our Group Captain read to us the details of the coming invasion, which was to take place at dawn the next morning. Directions on the tactics that we would use were given to us by our Wing Commander Flying, and it seemed that our main role was to escort and protect the naval vessels which would be beneath us. One point particularly emphasized was that we were to keep above a certain height when in the vicinity of shipping, otherwise we would be liable to be fired upon. We were confined to camp, and I think very few of us slept that night.

An hour before dawn we were dressed and at our dispersals where we gave our aircraft a check-over and a final run-up.

Very soon we were scrambled due to the fact that German aircraft were approaching our coast, but unfortunately they turned back for France before we could make contact.

Hurricane aircraft had been attacking the light coastal defenses around Dieppe and had machine-gunned every important military target they could find. Several of them returned back to base in a very shot-up condition.

Very shortly afterwards our squadron was detailed to take part in a wing in order to protect the shipping. As we neared Dieppe it was a fantastic sight to see the activity over and near that port. Small assault craft were churning their way towards the beaches, low-flying medium bombers were laying smoke-screens, a great fire was raging near the port, and the antiaircraft fire seemed to be coming up from all directions. Looking up into the sun, we could see quite plainly German fighters flying well above us and waiting for anybody who should happen to straggle from the formation. Occasionally, twenty or thirty of them would dive down upon our formation, but we were told that we must stay with the ships at all costs, and so all we could do was to turn towards the German aircraft, which in turn just dived away towards France and climbed back into the sun. Very foolishly, during one of these attacks I started to chase two of these FW 190's, who cleverly led me into the antiaircraft fire of our own ships. Quickly I broke off combat and rejoined my squadron. After we had patrolled for thirty minutes we returned to base to rearm and refuel.

We were controlled and notified of German aircraft by our home stations, but there were so many aircraft in the vicinity, both friendly and hostile, that it was difficult to be controlled at all, so that the only warning we usually got was the sight of German aircraft diving down on our formations.

My next sortie was to escort Boston medium bombers, which were to attack the gun emplacements situated to the east of Dieppe. As we neared the target once more, white clouds were beginning to form and this made the escorting rather difficult, but as we crossed the coast the clouds broke and our bomber formation dropped its bombs onto the gun positions. How anything could live with this carpet bombing I could not understand, but the next moment red Bofors tracer shells were scattered into our formations. I saw two or three of the bombers hit by the flak, but they were able to remain in formation and we crossed the English coast again approximately twenty minutes later without loss. Back at the base we had a short period of time in which to have snatches of food and light snacks which were brought round by

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the WAAF's [Women's Auxiliary Air Force] who work from dawn till dusk and carry out a very fine, useful job of work.

Our next operation was to cover ground and naval forces during the evacuation, which was carried out according to plan. Several German bombers appeared from out of the clouds in order to try to bomb our shipping. They were the JU 88 and the DO 217. Very foolishly, they came out without fighter escort and immediately our Spitfire squadron went in to attack. When the bombers saw our fighters approaching they all jettisoned their bombs harmlessly into the sea and tried to run for France low across the sea. One after another these bombers were shot down and only a very few out of the original forty which came out to attack ever returned to their bases. As we left France on this sortie we could see the weather was definitely beginning to close in, and when we returned back to England the clouds were forming up very appreciably.

During the afternoon we were called upon to do our last sortie of the day; once again this was to cover our shipping, which by this time was half way back across the Channel. The weather got steadily worse and worse the nearer we approached to England, and by the time we started to return to our base for the last time the clouds were as low as 500 feet. Our control told us that German bombers were approaching the English coast and so we climbed up through layers of clouds and made a perfect interception of several JU 88's. For approximately twenty minutes we played a game of hide and seek with these bombers who kept going back into the cloud the moment they saw our aircraft coming in to attack. But on two or three occasions they were unable to make cloud cover in time and were destroyed. With our gasoline nearly exhausted and the weather steadily deteriorating, we decided to return to base and call it a day. The few German aircraft that managed to cross our coast had come over to bomb airfields but they were all driven off by anti-aircraft fire.

Operation completed, we all retired to the mess and early to bed, feeling tired but very happy.

The squadron with which I had been flying had destroyed five German aircraft and probably destroyed a further three for no loss at all; so we felt quite pleased with ourselves. In all, ninety-eight German aircraft were shot down for a loss of ninety-three of our own; but as we were on an offensive operation for the first time against the coast of occupied France, we considered that we had gained a great victory.

Several people have criticized the Dieppe operation and have said that it was an unnecessary waste of men, but in my opinion the lessons learned from that operation proved invaluable during the subsequent Allied landings in North Africa, Sicily, and Italy, and perhaps for the coming invasion on the Western Front.

One Way To Do It

WHILE on its way to occupy a position about ten miles south of Pietraperzia, a field artillery battalion convoy was fired on by four snipers and two machine guns which were established high on the side of the hill overlooking the road. The convoy countered with machine-gun fire from the vehicles and with the 37-mm antitank guns of headquarters battery's antitank platoon. When the firing from the enemy positions ceased the 37-mm's were recoupled, and the battalion moved on. However, as soon as movement had been resumed the enemy began firing at the column again. Quickly tiring of this annoyance, the third section of Battery C stopped, dropped the trail of their howitzer on the road, and fired a round of HE directly at the hostile emplacements only 300 yards distant. They then resumed the march without further interruption.

Wire Communications with the Fifth Army in Italy

CAPTAIN JOSEPH E. SWEETS, *Signal Corps*

Captain Sweets went overseas in September 1942 as the Commanding Officer, Company B, of a Signal Service Battalion (radio operations). He installed and operated fixed radio communications at Oran. In May 1943 he went to Allied Force Headquarters as Executive Officer, Signal Systems, and to Fifth Army, 1 July 1943, as Wire Officer. He returned to the Office of the Chief Signal Officer, 22 December 1943, as a result of a special request to the Theater for experienced officers. His present assignment is Theaters Branch, Plans and Operations Division, Office of the Chief Signal Officer.—THE EDITOR.

THE problem of wire communication in Italy has been vastly different from that encountered in North Africa. In the latter case, it was necessary to cover great distances, comparable to the distances between widely separated parts of the United States; yet there was a reasonably modern telephone system almost intact upon which the army signal communications could be imposed. Thus, in the Casablanca—Oran—Algiers—Constantine area, an overall distance of some one thousand miles, it was only necessary to supplement and adapt the long distance lines available and to concentrate on the development and expansion of local facilities necessary for serving headquarters, port, and base supply groups. In Italy, while the distances encountered and to be developed are much less, it being approximately six hundred miles from the tip of the toe at the Messina Straits to the Po Valley, it has been necessary to provide, with a few exceptions, a complete telephone system for military use both locally and over longer distances. This is due, of course, to the extensive demolition work of the enemy, who have been particularly thorough in destroying trunk line facilities and the larger central offices of the city of Naples.

To meet the local exchange needs, the Signal Corps had available for some time various sizes of standard tactical switchboards. For longer trunk line circuits, it had developed a light tactical open wire line. It also had signal units trained for heavier construction. All of this was good where very moderate distances were concerned; however, it was not until near the close of the Tunisian campaign that there was introduced into the theater a system capable of furnishing high grade circuits over considerable distances. This equipment consisted of the spiral-four cable, a rubber-covered four-wire line and its associated terminal, and repeater equipment of the CF series. The CF terminal, by the use of high frequency carrier, provided over four wires, four telephone circuits of good transmission characteristics or three telephone circuits and four teletypewriter circuits. Used to some extent in Sicily, these carrier systems have literally proved life savers in Italy. Though originally designed for use with the spiral-four cable, the CF carrier terminals are being used on rehabilitated open wire lines with excellent results. By design, this equipment has a low power supply requirement, thus simplifying its use where all power must be furnished by local generating installations. The telephone circuits provided have better talking characteristics and the teletypewriter circuits are less susceptible to wet weather troubles which are common to all ground return circuits.

After the initial and more spectacular phase of the Salerno beach landing, the job of furnishing wire communications began. It rapidly became a problem involving a constantly increasing wire network with a call load which grew in accordance with some higher mathematical ratio, always, it seemed, just beyond the capacity of the circuits and switchboards available to meet it.

For the landing operations, certain of the headquarters personnel of the Fifth Army were aboard the D and D+2 convoys. After the initial assault landings on 9 September, sufficient army command post headquarters personnel were ashore and functioning making it necessary to set up and have in operation by the night of 12 September a switchboard with from fifteen to twenty-five local

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stations. On the evening of 13 September, the tactical situation was such that it became necessary to move this set-up. At the new location, construction of a complete army headquarters communication system was begun with circuits for communication by both telephone and teletypewriter with corps headquarters (U.S.). On 16 September, wire communications were satisfactorily established to British corps headquarters. Several earlier attempts to operate wire circuits to the British corps were unsuccessful due to a definite attempt on the part of the enemy to prevent the junction of the American and British landing forces, the wire circuits being continually knocked out by enemy action. Later, as the development of the tactical situation became more favorable, all communications were expanded and by the end of September a total of four switchboard locations, one of which was a three-position TC-1, were being operated by army signal units to give wire communication for the command post, rear echelon, and other locations convenient to supply dumps and separate units. This layout included 118 local telephones and was exclusive of all locations and interconnections through corps and divisional headquarters switchboards. During this period, very few existing facilities were found to be usable due to the extensive demolition work of the Germans. An overhead wire line was found consisting of one heavy gauge two-wire circuit and one four-wire group. This was used after only a reasonable amount of rehabilitation for lateral communication to the British Eighth Army.

A command decision as early as 13 September, definitely separating the headquarters between the army command post and the rear echelon, reduced the load to be handled at any one switchboard installation but created the need for providing a large number of interconnecting trunks between the two locations. In this set-up, trunk circuits were terminated at the command post switchboard. To facilitate frequent moves, mobile switchboard installations consisting of a three-position TC-1 were made. These installations were complete with testing equipment and all circuits were brought out to convenient terminal strips. The CF type carrier equipment was located, if possible, in a suitable building, and the circuits brought over for termination in the switchboard in multiple pair rubber cable on an individual basis. Teletypewriters also were located in buildings as a protection against dust or moisture.

A total of fifty-eight locals were served from the three-position TC-1 at the command post, from which calls running as high as 4,800 daily, incoming and outgoing, local and trunk, were made during an average day. Approximately ninety-five percent of these calls were connected between 8:00 AM and 8:00 PM. A total of ten trunks were available between the command post switchboard and the rear echelon board at the time this count was made, and frequently all trunks would be busy. A two-position TC-4 switchboard was in use at the rear echelon with fifty-nine locals. Traffic counts indicated that a daily average of 3,500 connections were being made.

Signal communication by wire within the division and between corps and division is generally over circuits of temporary construction, which, when time permits, are removed when the need for them no longer exists. In army to corps communication, the circuits are, in general, in use for longer periods of time and may also be used when army moves up for communication rearward to higher headquarters or base sections. Thus, a more careful choice of routes and a more permanent type of construction will generally be justified.

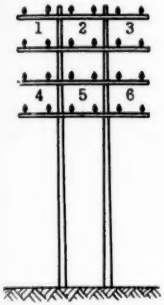
Accordingly, an immediate survey is made in each newly occupied area so that usable telephone plant may be taken into the communication plan, whether it be poles, equipment, or underground cable.

The planning of wire communication ahead of the army command post was made relatively easy since advance could be in general in only one direction, namely, up the peninsula. However, careful planning of the main axis of communication was none-the-less necessary, as was the selection of one or more secondary communication axes as required

for each corps where these headquarters were some distance off the main communication axis.

Peacetime Italy had a well developed communication system, its backbone being an underground cable up the west side of the peninsula with adequately equipped central offices and repeater stations. These facilities were in general unavailable because of extensive destruction. The secondary system consisted of open wire lines for commercial use as well as open wire lines for railroad and power line dispatching. While these lines were also destroyed, the damage could be more readily surveyed and poles and wire which were usable could be quickly fitted into the advance planning of the Army Communication Officer. Where any appreciable section of open wire construction was found in place, it was more economical of time to restore existing Italian schemes of wire transpositions in the adjacent sections rather than convert the existing wire to U.S. standard systems.

First information as to existing transposition arrangements had to be determined by actual field inspections of the wires found in place. Typical grouping was four wires in the form of a box with the wires on the diagonal corners forming a circuit. Two of the wire transposition schemes more commonly found are shown in Figures 1A and 1B. The army's



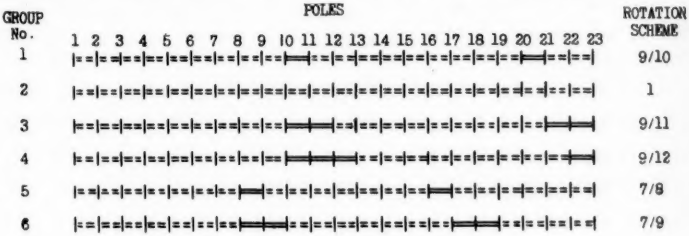


Figure 1 A

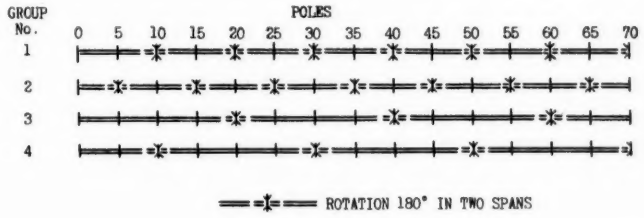


Figure 1 B

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CF-1 and CF-2 carrier telephone and telegraph systems were used over the open wire lines thus restored and provided communication circuits with excellent transmission characteristics. For temporary construction often used between corps and division, spiral-four cable was used in lengths up to forty miles with one intermediate repeater.

Following the usual Signal Corps organization, all construction from the army to the corps was handled by signal units assigned to the army. In the average situation this was found to require at least one wire construction company for each corps, with maintenance teams stationed at each corps headquarters for rapid trouble clearance, and on the

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longer lines at intermediate points. Permanent open wire rehabilitation was carried beyond existing corps headquarters along the selected communication axis routes so that these circuits would be available for future moves. Where advantageous use could be made of this advance construction in the corps to division or otherwise in the corps wire layout such use was made only after specific approval of the army wire officer. In all cases of planned corps moves, at least twenty-four hours' advance notice was required by the Army Signal Officer in order that the necessary circuit rearrangements could be coordinated.

The organization of the Fifth Army, even in the landing operations at Salerno, was international in that it included a British corps. In later operations, this international character was expanded to include the French. In each case, signal coordination was handled from the army down by the presence in the army signal section of a liaison officer from the British and the French, and further by the presence of an American signal team at the French headquarters. Actual interconnection was made as required between the wire networks so that telephone calls could be put through directly. For teletypewriter interconnection, technical methods involving a change in speed and mechanical adjustments were worked out in North Africa to operate U.S. and British machines on the same circuit. These changes, while permitting operation if necessary, were not always satisfactory over an extended period so that it was generally found more economical of maintenance time to place U. S. machines at British headquarters or other locations where British access to U.S. circuits was desirable. As the French had no comparable equipment, U.S. machines were used at the French headquarters with U.S. operating teams. Thus coordination was obtained over enemy destruction, language handicaps, and the technical differences of equipment toward a smoothly working army communications system.

Infantry Fire

MANY reports emphasize the value of concentrated fire. Concentration of fire requires careful preparation. While a concentration is being prepared, each company, and indeed each platoon, will exploit every favorable opportunity for advancing and providing the necessary impulse by concentrations of fire on its own account . . .

The infantry made too little use of its excellent weapons. It is most important that the infantry when it bumps the enemy should not only shout for artillery support, but also help itself with its own weapons. It must use its first-class offensive weapons of all kinds to the fullest effect, without exaggerated attention to economy of ammunition, though at the same time without senseless extravagance. Attacking troops must constantly watch for opportunities of exploiting the fire of the MG 34, by shooting through gaps and from overhead positions, but more particularly by employing machine guns right forward. Narrow formations in the attack favor the fire of machine guns from positions through the gaps that are formed. At close range large numbers of machine guns are to be employed right forward in order to achieve superiority of fire.

—Von Brauchitsch on the conclusion of the German campaign in France in 1940. Quoted by Major General T. N. F. Wilson in *The Journal of the Royal United Service Institution* (Great Britain) February 1944.

Jungle Operations

An article by Lieutenant Colonel Roy W. Cole, Jr., Headquarters 8th Cavalry, in *The Cavalry Journal* March-April 1944.

AS a result of the first staggering series of Japanese victories in the Far East, there appeared a vast amount of literature designed to explain the revolutionary tactical doctrines employed by the Jap. To a great extent, the information was both spectacular and ill advised, in that it built up in the minds of those intrusted with the training of our troops the legend of the Jap super soldier.

After this phenomenal build-up, history was largely forgotten and the immutability of the proven principles of war was momentarily scrapped in an effort to devise the means of out-Japping the Jap. Innumerable SOP's were designed to suit every jungle situation, and it was not until we were brought back to earth by the performances of the Marines on Guadalcanal and of army troops in the Papuan campaign, that training once more assumed a realistic attitude. Then and then alone was it realized that the mysteries of jungle operations were an open book to one whose basic tactical training was sound, and that the teachings of the service schools, when applied with due consideration for terrain, climate, and logistics, still applied.

Another factor, which has resulted in a change of attitude, came as a result of the initiative passing over to forces of the United Nations. Air and naval superiority combined to make the Allies the aggressors—gave them the opportunity of carrying the fight to the enemy instead of conforming to his strategic aims. Today, with the Jap admittedly committed to the defensive along the far flung reaches of his perimeter, it is known that only by a properly supported and vigorous attack can the forces of the United Nations succeed in driving him out.

Combat experiences gained in the past year against some of the best forces of the Japanese Empire have resulted in realistic reports which both enlarge on enemy doctrines and correlate the problems of jungle combat with our own methods. This article simply reiterates certain items of importance to all those who will meet the Jap on his own ground.

Pin-pointing the Enemy.—As soon as contact is gained, every effort must be made to locate with precision elements of the enemy position. Small and aggressive patrols, working around the enemy flanks and into his rear areas, coupled with close-in patrols feeling out the enemy front, will pin-point enemy installations. If it is desired to maintain standing patrols in the rear of the enemy position, they should be strong enough to be self-sufficient and able to meet the attack which will result from their discovery. As a general statement, the small patrol will give better information, since a large force is both difficult to move and to maintain when out of contact.

Fire Power.—Once the enemy position has been pin-pointed, and the location of pill boxes, headquarters installations, and automatic weapons plotted, the attack must be prepared by every means available to the commander. Fire power is the key which opens the lock, and massing the fires of both organic and supporting weapons will be the rule rather than the exception. From recent experience in the European theater, it has been found that if the situation warrants, the entire division artillery may be concentrated in support of the attack of a single unit. Commanders of all echelons must be made to employ every means of fire power within their disposal, and to remember to include the possibility of air support to further their preparation.

The Assault.—After the position has been pin-pointed and the plan of supporting and preparatory fires agreed upon, the troops must begin their movement under cover of artillery and mortar fire. The truism that it is better to take one percent casualties from our own weapons than ten percent from the enemy should never be forgotten. Under ideal conditions, troops can crawl to within a comparatively few yards of their artillery barrage without danger. As soon as the last

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rounds are on the way, the troops must be either on the enemy position or in the shell holes caused by their barrage before the enemy has a chance to recover from the shock of the preparation and man his weapons. This process should be repeated until the enemy works are gained. The success or failure of an attack will be determined by the manner in which subordinate leaders initiate the assault, and hesitation will inevitably result in avoidable casualties which can never be justified.

An Island of Resistance.—Should isolated pill boxes hold up a part of the attack, reserves must be committed through the gaps made in the enemy position. Flame throwers, bazookas, and AT grenades, supported by smoke, small arms, and automatic-weapons fire, will prove to be invaluable in reducing these pill boxes. If the bunker is not isolated, it is well to remember that the Jap usually organizes with one forward pill box supported by the fire of two in its rear. Hence, the other bunkers capable of firing at the operators must be covered as well. The caliber .50 machine gun has been found to be well suited as a supporting weapon.

Continued Pressure.—Once the enemy is driven out of his position, he should be kept off balance by a continuous pushing that allows him no chance to get set. The Jap has been found to break under such continued pressure, because his small units tend to become confused when not specifically instructed as to what they should do.

Digging In.—Defense should be organized as soon as the objective has been attained. This fact must be made an actuality in the shortest possible space of time. During this phase, if the enemy position cannot be made tenable and it is necessary to dig in, the men must dig in lying down. There have been too many casualties from snipers caused by men digging in while standing up, for even after the Japs have been expelled from a position, there will still be snipers waiting to take a crack at anything that moves. Although the marksmanship of the average Jap is generally poor, some of their snipers are excellent shots.

Mopping Up.—When the enemy position is gained, special mop-up detachments must clean out all trenches and dugouts overrun in the assault. Other troops must be given antisniper missions both in and after the assault, as the tree snipers will pick the leaders who are the mainsprings of success. When the nature of the jungle permits, during the last stages of the fire preparation it is wise to have the machine guns spray the trees left standing on the enemy position, as an added protection against snipers.

It has been found that meal formations are favorite times for snipers to fire; also, that they are prone to engage small groups, say three or four men walking along a track, but will pass up any larger group in the belief that it is too dangerous.

Countersniping.—In countersniper operations, it has been determined that only predesignated men should do the firing. When in bivouac, the three-man team of sniper-observer-sniper should be used. These men should be emplaced on the extremities of the area. Other groups should be used in trees to supplement the ground posts. These groups will systematically return all sniper fire by engaging likely looking trees and positions in the general direction from which the fire originated.

Another successful method of combating snipers, especially in a mobile situation, has been to send out a three-man patrol under cover of a harassing fire to work into position close to the enemy sniper.

Enemy Counterattack.—If there is one principal of tactical training which has been substantiated in every battle, it has been the Japs' unvarying practice of counterattacking after having been driven from a position. Such attacks will usually come as soon as the Jap can reorganize, and more often than not will take the form of isolated attacks launched as the leaders work their men up to it. The coordinated attack is rare in circumstances.

Jap Methods.—Prior to the Jap attack, a diversion in the form of firing and noises of various kinds can be expected, but the attack itself will come from another direction. Dur-

ing the hours of darkness, the crawling attack is generally made, although the probability of the headlong rush should not be discounted. On New Britain, the Jap has made no attacks whatever during the day, so it appears that he believes that his best defense against our fire power is still the night attack.

The Jap Night Attack.—Under no circumstances should automatic weapons be used to fire at enemy noises, as the Jap is endeavoring to locate our automatic weapons.

Regarding Jap night assaults, the decision must be made by the front-line commander in the threatened sector as to whether or not the Jap is launching a general attack. Once the decision to fire is made, everything must be poured on at once, both for the shock action that such a volume of fire will bring and also for preventing the discovery of isolated weapons.

Infiltrations.—In close fighting against infiltrating Japs, troops often wait for them by lying in their holes and, in order to shield the muzzle blast of their weapons, fire up from their positions as a Jap comes into view over them. This is an example of the extremes to which our troops go to prevent their positions from being discovered.

In the Enemy Rear.—In contrast to the first stages of the war, the Jap is very nervous when anyone is operating in his rear areas. In fact, he is more worried about it than we are, as we are better prepared for it mentally. Apparently, the discipline of the Jap behind his lines, both in lights and talking, is poor, and to date it has been an easy job to ambush Japs without loss to ourselves.

Foxholes.—Troops in Africa reported early in their campaign that the slit trench as such was worthless. The deep foxhole gives the man far more protection especially from shelling or bombing attack, and is an almost perfect protection from strafing. Troops have suffered needless casualties because they failed to put some kind of roof over their shelter.

Frontal Attack.—Regardless of the principles of fire and movement, the small unit must be trained in the frontal attack. In the final stages, the ultimate assault will be to the front.

Leadership.—During the attack, the subordinate leader must decide whether to lead or to urge his men. The determining factor will be the attitude of the troops themselves. Fresh, confident troops should be led by their officers, for the desires and inspiration of a leader will be impressed on them better by example than by any other means. The psychological reaction of the good soldier will be to try to surpass his fellows, and if the impulse is given him, he will drive the attack home.

Supply.—It has been found that while the majority of junior officers become excellent combat leaders, their assumption of responsibilities of supply leaves much to be desired. Subordinate officers should be instructed that supply is a command responsibility which cannot be delegated.

Jungle Training.—With observation in jungle terrain as difficult as it is, observers must be given special training in the use of tree climbing and in the use of the rope tied between their feet for climbing coconut palms.

The use of smoke for initial bursts is one of the best methods for spotting.

Machine gunners should be trained to use the caliber .50's to cut through the jungle, and once a lane has been made, to emplace a .30-caliber instead.

In instances already reported, our troops are far faster on the trigger than the Jap is. While the Jap takes some seconds to react, the American soldier can get off two or three shots before the Jap even gets into action. Our better rifles are of inestimable value in this sort of fighting.

Special Instructions.—When time permits, a defensive perimeter should be surrounded by booby traps.

In all actions in the South Pacific, the use of the grenade is universal. Our troops have been carrying up to half a dozen in the mess kit holder in their pack or in an extra canteen cover.

When the impact area of mortar fire is soft

dirt, the light shell detonates better than the heavy. Because of the close proximity between units, the bracketing system of adjustment is usually not possible. The creeping method is the generally accepted manner of getting the fire on the target.

If possible, fire support should be perpendicular to the direction of attack; there is less lateral dispersion.

In heavy kunai grass, it has been determined that the approximate penetration of the several weapons are as follows: caliber .30 MG—thirty yards; caliber .50 MG—fifty yards; 37-mm gun (using canister)—forty yards.

The three-man foxhole with about ten yards between holes is the accepted standard for defensive works in jungle operations.

With the exception of a general attack, the BAR should be fired single shot in order to conceal the fact that it is an automatic weapon.

In conclusion, it must be emphasized that these notes are by no means the last word in jungle operations, and neither are they complete, for war is still an art rather than a science. It is believed, however, that they do add additional meat upon the basic structure of our tactical knowledge. The tactics employed for any one particular operation must be governed by the variables imposed by the situation. A complete flexibility of mind coupled with a willingness to accept the proven doctrines established by successful combat troops will insure victory.

Military Training in Soviet Schools

From *Information Bulletin*, Washington Embassy of the USSR, 9 March 1944.

Major General Borisov, Assistant People's Commissar of Education of the Russian SFSR [Soviet Federated Socialist Republic], recently gave the following summary of results of the introduction of military training in Soviet schools more than one and a half years ago:

THE PROGRAM accepted for school children, which provides for primary military training for pupils, has worked out satisfactorily everywhere. The separation of boys and girls in the schools has contributed greatly to the success of military training. In girls' schools, attention is mainly concentrated on medical training and the signal services, while in boys' schools student drills and shooting practice are the main items.

The military training instructors in the schools are officers of not less than three years' service in the Army, the majority of whom are veterans of the present war. Military departments, medical rooms, and shooting ranges have been set up in the schools. The local factories take part in equipping these, and a large quantity of training equipment is made by the students themselves, including spades, wooden dummy rifles, etc.

The school children perform the task of guarding the military property in schools, and thus learn the duties of a sentry. Military training in schools is taught in a lively, interesting manner. Obstacle courses with trenches, barbed-wire entanglements, and other barriers have been created near some schools. Here the children learn to crawl, study the technique of personal combat, "storm" enemy blockhouses, etc. Often militarized games are conducted outside of the town. This summer over 80,000 upper-grade boys were trained in camps in the Russian SFSR.

Telegraph apparatuses have been set up in many girls' schools. The pupils send messages from one part of the building to another and lay telephone lines. Upper-grade girls have training in hospitals. In Leningrad, the school girls who passed their first-aid course were very helpful in caring for the wounded, and many received military awards.

Reconnaissance Aviation

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IN all theaters today Reconnaissance Aviation is playing a role as an intelligence agency of the highest order. The importance of the military intelligence derived in this manner is sometimes not generally understood or appreciated. The capabilities and limitations of Reconnaissance Aviation should be fully understood not alone by the officers of higher staffs but by subordinate officers as well.

Reconnaissance Aviation can be broadly divided into two types, Strategic and Tactical. Strategic Reconnaissance, as its name implies, is concerned with long-range operations. These operations are conducted for the benefit of the Theater Commander, the Strategic Air Force, and the Theater Air Commander. Tactical Reconnaissance, on the other hand, operates under the Tactical Air Forces and Tactical Air Division Commanders in the performance of visual and photographic missions for the Tactical Air Force, the Tactical Air Division, and for the ground force units operating in a particular theater.

Strategic Reconnaissance Aviation is normally organized into a Strategic Reconnaissance Wing or similar organization. In such a wing will be found four-engine squadrons and two-engine squadrons. The airplanes in these squadrons have been modified to permit their use on reconnaissance missions. The four-engine aircraft, B-17's or B-24's, are used for reconnaissance to the extreme limit of their range. They find their greatest employment in areas where the enemy defenses are not too concentrated. This type of squadron performs long-range mapping and photographic missions at high altitudes. Due to the extreme ranges at which they operate they are generally unescorted and hence more vulnerable when employed over heavily defended areas. The aircraft are equipped with multiple camera installations, with the armor, armament, and crew normal to a heavy bombardment airplane. They are used for precision mapping photography because of the extensive coverage permitted by reason of their long range. An outstanding example of the employment of this type airplane was the publication in the press of the reconnaissance conducted by two Marine Liberators (B-24's) of the Japanese stronghold of Truk in the Pacific. Certainly the study of the photographs secured in this manner are invaluable in future operations.

The two-engine squadrons that will be found in a Strategic Reconnaissance Wing are of the P-38 or F-5 fighter type. These, of course, are modified for their use in reconnaissance work. They are stripped of armament and have extensive camera installations. They do not have the range of the four-engine type but are capable of great speeds at high altitudes. The corresponding type aircraft in the British service is the Mosquito which has a longer range than the P-38 or F-5. In our service these two-engine squadrons perform medium-range photographic missions and tri-metrogon mapping, secure target information, and cover areas for bomb damage assessment. This type of squadron has organic but limited facilities for photo processing and interpretation.

There will also be found in a Strategic Reconnaissance Wing a Photo Technical Squadron. This is a semi-permanent installation. It has technical facilities for the quantity production of all types of photography except precision mapping, charting, and compilation. Organically this squadron will have a large number of photo interpreters for interpretation work. Precision mapping, charting, etc., will be accomplished by a ground force Engineer Topographic unit working in cooperation with the Photo Technical Squadron.

In considering the employment of Strategic Reconnaissance Aviation the first consideration is one of the combat ranges of the various type airplanes. This range is arrived at by evaluation of fuel consumption, speeds, etc.; it must make allowance for full-throttle operation in case of necessity. The four-engine bomber type has the great-

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est combat range. It can fly missions of approximately 2,500 miles. The P-38 or F-5 airplane of the two-engine Photo Reconnaissance Squadrons have a combat range, using belly tanks, of 1,200 miles. The combat range of the British Mosquito is somewhere between our four and two-engine types.

The altitudes flown by Strategic Reconnaissance naturally will vary with the theater, the nature of the enemy opposition, and the equipment available. The desirable altitude is one approaching 30,000 feet, as it gives comparable safety from interception, detection, and flak. There are certain limitations upon the ability of Strategic Reconnaissance. These are always present in varying degrees and are similar to those affecting all classes of aviation. Weather, of course, is the primary obstacle. Cloud cover may be present to afford protection to the objective, but on the other hand it may be present over the objective and conceal the target. Good weather is the ideal but it makes detection and interception more likely. The depth of penetration with relation to the combat range is governed by the location of the home airdrome. The closer to the objective of the airdrome the greater depth of penetration. The intensity of antiaircraft fire and fighter opposition has a direct bearing on whether a pilot can follow a certain flight line or accurately pinpoint a target.

Tactical Reconnaissance Aviation operates under the Tactical Air Force and Tactical Air Divisions of the Tactical Air Force. Some of it may be retained directly under the Tactical Air Force and some will be parceled out to the Tactical Air Divisions. Tactical Reconnaissance Aviation is organized into groups which in turn contain Tactical Reconnaissance Squadrons and Tactical Photo Reconnaissance Squadrons. The exact composition of such a group will depend upon the requirements of the theater and other considerations.

The modified P-38 or F-5 is the airplane used for Tactical Photo Reconnaissance. It is the same type as used by the Strategic Reconnaissance, the only difference being its manner of employment. The mission of these squadrons is entirely photographic and they operate at altitudes consistent with the particular mission upon which they are engaged, and considerations of safety. These missions which they perform are generally high altitude reconnaissance missions for the Tactical Air Force, the Tactical Air Divisions, and the ground force commanders.

The P-51 airplane or "Mustang" is the best suited for Tactical Reconnaissance work. It is equipped with an oblique camera and the normal armament of the fighter-type airplane.

These squadrons perform visual reconnaissance missions for the Tactical Air Divisions and the ground commanders of the forces with which they are operating. These visual observations may be supplemented by oblique photographs taken with camera installations with which the airplane is equipped.

The Tactical Photo Reconnaissance Group has a Photo Laboratory Section. This is a mobile trailer unit equipped to produce quantity prints for the group.

When we consider the objectives and types of missions that Tactical Reconnaissance Aviation can perform we come logically to the three phases of tactical air operations. In all of these phases the photographic and visual means of Tactical Reconnaissance Aviation are employed.

In phase one, operations are conducted against the enemy air force. In this phase Tactical Reconnaissance missions are concerned with the location of enemy airdromes, the installations thereon or adjacent thereto, and the types and number of aircraft located thereon. Normally, this information will be secured through photographs taken by the Tactical Photo Reconnaissance Squadrons. In some instances where time for processing and interpreting photographs is not available, then visual reconnaissance can be resorted to in order to secure this vital information.

Phase two involves operations against hostile rear areas for the purpose of isolating the battlefield. During this phase, Tactical Reconnaissance Aviation will be used to

locate troop concentrations, troop movements, lines of communication, supply installations, and shipping facilities. This information will be secured by both visual and photographic means by both types of reconnaissance aircraft. This information is made available to the offensive units of the air for exploitation. The attack of such objectives assists in the isolation of the battlefield.

Phase three involves joint air-ground operations in the battlefield area, and here reconnaissance missions, both visual and photographic, will aid in locating or verifying the location of enemy command posts, troops, and reserves in or just in rear of the front-line areas. They will aid in the location of objectives such as tank barriers, ponton bridges, artillery emplacements, and others of immediate concern to the ground force commander. Information of this nature will generally be secured from pilots on visual reconnaissance missions with occasional oblique photos to verify their visual observations. This type of information will, in most instances, be delivered to the ground forces without the attendant delay due to developing and interpreting photos. This permits the ground forces to exploit to the fullest the information secured. Offensive air units also use this information in attacking proper targets in the area.

There is another type of mission which Tactical Reconnaissance units can perform and that is the adjustment of long artillery fire when the organic Cub plane of the artillery cannot operate. This type of mission can be successfully accomplished but it must be pre-planned long enough in advance to allow a complete exchange of information between the artillery and the squadron flying the mission. This same form of mission can be adapted to the adjustment of naval gunfire on targets on land. Here also, considerable pre-planning, coordination, and special training must precede the actual flying of the mission.

The skill of the pilots of both Tactical Reconnaissance and Tactical Photo Reconnaissance has a direct bearing on the amount and accuracy of the information obtained. A highly trained pilot of a Photo Reconnaissance airplane must be able to navigate to reach his objective and plot his flight line accurately. He must be able to pinpoint his target accurately from high altitudes. Similarly, the Tactical Reconnaissance pilot must be trained to recognize and report on what he sees. He must be familiar with enemy equipment and tactics and with navigation at low levels. To be able to locate upon the map objects seen from the air while flying at high speeds is a very difficult job.

Considerable attention is now being paid to the use of liaison officers from the ground forces. These officers are located at the airdromes from which the planes operate. They are invaluable in interpreting the ground situation to the air. They also can be used in briefing and interrogating pilots for information which the ground particularly needs. Whenever possible they should be employed and they should be selected with care.

It should be pointed out that the organization of Reconnaissance Aviation will vary considerably with the theater. In a theater you may not find the exact set-up that has been set forth above. Where we are combining our operations with those of our Allies you may find that reconnaissance is organized into a command rather than a wing or group and the greater part of the work centralized under this command. Again the requirements of the theater may necessitate independent operations by single squadrons. In one theater where such a command organization exists there were flown in a recent month approximately 600 missions, all photographic. The results of these missions took the form of over 1,000,000 prints which were used in the various echelons. In further analyzing the operations, this activity and the subsequent interpretive effort were divided roughly into slightly less than thirty percent each to the Air Forces and Navy and other forces, and the remainder, over forty percent, was for the Army Ground Forces. These figures are significant in pointing to increased activity on behalf of the ground forces. In this theater the aim is to provide photographs for tacti-

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cal operations down to assault platoon leaders.

Again to give some figures that point the lesson for Tactical Reconnaissance Aviation, one such P-51 squadron in approximately eight months of operations including three amphibious operations has flown over 2,400 sorties. Figuring two airplanes to a sortie, you have 1,200 missions or an average of 150 missions a month or five per day. These are average figures, and when you appreciate that there were a great number of days when it was not possible to operate, then the number actually flown per day rises considerably. In one recent month a total of 175 missions was flown, on eighty-four of which photographs were taken, and 9,000 prints were made and distributed. These figures are for the operation of a single Tactical Reconnaissance Squadron. On one recent mission a pilot located visually enemy fighters dispersed under trees and the resulting photographs disclosed twenty-two in all and a fighter strip that until that time was not known. On another occasion a pilot observing activity in an important railway yard descended to 1,500 feet and streaked over the yards. The photographs here showed approximately 1,000 loaded cars in the yards.

Planning staffs are making extensive use of the intelligence compiled as the result of intensive interpretation of aerial photographs. These are constantly being made available in compact and readable form and they give a great amount of detail that is vital in this type of work.

Today in the field, maps are being prepared from or corrected by the use of the photo mapping cameras. Mosaics are being put together for staff use and also used in the construction of actual models of the terrain under study. All of these operations result in intelligence of value to all staff officers, who should fully appreciate the capabilities and limitations of this intelligence agency. They should appreciate the necessity for pre-planning of reconnaissance missions to insure that sufficient time is available to execute the missions properly and disseminate the resulting intelligence.

Training in Jungle Patrolling

A REPORT from the Southwest Pacific contains the following comment on the necessity for specialized training in scouting and patrolling in the jungle:

"The usual scouting and patrolling training given in the United States must be supplemented by specialized training in overcoming the difficulties and performing the missions peculiar to this theater.

"Men should be carefully selected for this additional training. They must be soldiers who can *do* things, by unorthodox methods if necessary, rather than those that are academically perfect but untrained in or physically or mentally unfit for the practical application of the instruction. In every organization there will be found many officers and enlisted men with considerable natural abilities for this type of duty. It is so important to the success of any operation in this theater that full advantage must be taken of such personnel. Their deficiencies should be corrected insofar as practicable by training and practice.

"All members of the intelligence unit can not be expected to be expert in all phases of their work, but since they operate as teams or groups, the individuals may be complementary. It would, therefore, appear advisable for each organization commander prior to leaving the United States for the Southwest Pacific Area to give careful thought to the selection and intensive training of his scouts and other intelligence personnel."

The Armored Division in the Attack

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EVERY outfit in history that has developed means of *moving faster* and *hitting harder* than the other fellow has won battles by employing those two principles. Stonewall Jackson with his "foot cavalry," Forrest with his horse cavalry, Napoleon with his new methods of marching infantry, all "got there fustest with the mostest," and won their battles.

It so happens that today the *armored division* is the outfit with the most mobility and fire power. It is organized primarily to perform missions that require these characteristics; in other words, to perform missions beyond the *power* of other ground troops. It is given decisive missions—missions which, when the principles of boldness and speed are properly used, will pay large dividends.

Its primary role is in *offensive missions*, in *hostile rear areas*, where decisive results can be obtained. In other words, we attack the enemy in his rear areas, disrupting his line of communication and destroying his rear installations. It *can* be and often *is* used for other kinds of missions in other areas; but in so using it we are wasting those very characteristics about which we have been talking, the very things which give this division its *advantage* over other types of ground troops.

How does an armored division attack? Quoting from our Field Service Regulations: "Tactical operations of an armored division are characterized by *bold* maneuvers, executed at *high speed*, to create a *preponderance of power* in the *decisive* area. Operations are predicated upon *deliberate*, *detailed* planning and *rapid*, *aggressive* execution. The attack is launched in *mass*, in a *decisive* direction, with such speed and violence that the enemy is afforded no time or opportunity to organize and coordinate his reaction before the armored attack mission is accomplished" (Italics ours).

Our Field Service Regulations list four essential conditions necessary for a successful attack:

a. Surprise.

b. Favorable terrain.

c. Absence or neutralization of massed antitank defense means.

d. Air superiority.

FM 17-100 lists *air superiority* and *surprise* as *desirable* conditions, but lists "effective air and ground reconnaissance" and "adequate reserves of supplies" as *essential* conditions.

It is possible to win without surprise, if we have force enough, but goodness knows surprise is highly desirable. Without surprise we are not very likely to find that other essential, "absence of massed antitank defenses." So there is no question that surprise is highly desirable, if not absolutely essential.

The nature of the terrain leading to and occupied by the enemy most certainly does *influence*, if not actually *govern*, where the armored division can attack. For the attack of an armored division to be successful, the terrain must be negotiable by tanks, with at least an appreciable amount of their inherent *speed*. If tanks are forced by the terrain to go so slow that the enemy can get all set for them, their chances of success will be very small and it would probably have been better to have used infantry.

The most *desirable* type of country for tanks is open, rolling country with good, firm ground and few streams. *Ridge lines* quite often fulfil these requirements. That is the ideal, but very seldom attainable. Tanks *can* and *do* use country that falls far short of this ideal. There are, however, certain types of terrain over which tanks simply cannot *maneuver*, and there is no use for an armored division attempting to *attack* over this type of terrain. Swamps, mountains, heavy woods, large towns, or any ground where the going is extremely soft are examples. On the other hand, tanks can often be *taken* where the terrain is considered impassable and for that reason is left undefended. By such methods the division can

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sometimes gain such surprise that it is worth the loss of time.

Terrain is not the only obstacle that can stop tanks. Since the beginning of this war, man has invented quite a few himself. The most potent of these are *minefields, massed antitank guns, antitank ditches,* and *tank traps,* in the order named. It's *possible,* where time is all important, for tanks to break through minefields, but the casualties will be extremely high and we will be playing the enemy's game to his own tune. For tanks to fight their way through massed antitank guns would be even more costly than breaking through a minefield. The antitank guns, from their *stationary, well concealed* positions, certainly have all the advantage over the moving tank out in the open, so that the ratio of losses between tanks and guns would be all to the enemy's advantage, even if the tanks were able to break through.

The attack of an armored division can be succesful without air superiority, as was amply demonstrated by the Germans in Africa, but no one can deny that it gives the division a tremendous advantage in surprise, security, and the ability to move rapidly in the daytime. So if not absolutely essential, it is certainly highly desirable.

Now let's examine the other two conditions listed in 17-100. First, "adequate reconnaissance." The chances of success of an armored division attack against the Germans, unless both our air and ground reconnaissance secure for the division commander that vital early information of the enemy so necessary for an intelligent plan of attack, will be very slim. We learned that lesson the hard way in Africa.

As for the last point, "adequate reserves of supplies," the key word here is "reserves." The attack may have been successful, but what good will it do the division if it immediately has to leave the objective it has just captured because it is out of ammunition? Again, what good will it do the division to reach its objective and find itself without gasoline? A tank that cannot move is a mighty vulnerable object. Adequate reserves of supplies are an absolute essential to the success of an attack.

In the armored division the commander has a variety of tools with which to work:

Cavalry—to get his early information of the enemy and avoid being surprised.

Tanks—as his main striking force.

Artillery—to form his base of fire; to pin the enemy to the ground and to soften him up for the kill.

Infantry—to make the hole when the antitank defenses are too strong or too costly for the tanks; to protect the tanks during reorganization or in bivouac; to protect the artillery in the base of fire.

Engineers—to prepare the way and enable the tanks to reach their objectives.

And finally, the service branches—to keep the rest of the division in condition to fight.

In addition to his organic units the division commander may normally expect to have attached:

Tank destroyers — to repel the enemy armor.

Antiaircraft artillery—to protect against air attack.

When acting as part of a larger unit, especially when making the main effort, the commander can expect help from the corps and army artillery and at least *indirect* help from the air. At times, airborne troops may be used to seize critical points in the direction of movement and thus help the division reach its own objectives.

How does the division commander *use* this wide variety of tools to accomplish his mission? By organizing his units into task forces, each with the proper proportion of arms to accomplish *its* part of the division mission. There is an almost infinite variety of such task forces that *can* be formed, but almost invariably you will find that the organization of the division, in general, conforms to one of the three organizations given below.

1. The division divided into three equal teams, each consisting of one tank battalion, one infantry battalion, one artillery battalion, and a company of engineers. A reconnaissance company would be attached to

Combat Command A and one to Combat Command B.

2. The entire division divided into two combat commands. One combat command would contain all three tank battalions, one infantry battalion, one artillery battalion, and a company of engineers. The other combat command would contain two infantry battalions, two artillery battalions, the engineer battalion (—), and the division artillery headquarters battery. All of the reconnaissance battalion would be kept under division control.

3. Same as *2* above, except that one tank battalion and the engineer battalion (—) would be held out as the division reserve under the reserve commander.

The two combat commanders with their complete staffs and the reserve commander with his small staff give the division commander the means of handling and controlling his division when organized into these task forces. In fact, they were placed in the division for that one purpose. The division commander has adequate means of communicating his desires and orders to these subordinate commanders by use of *radio*, *liaison officers*, and *mounted messengers* in a moving situation, and by the additional use of *telephone* when the situation is static.

When should the *armored division* be employed? Only when the essential conditions for success are present and a decisive blow can be struck. In other words, the armored division should be held for the *knock-out blow*. Committing the armored division without the essential conditions and on other than decisive missions will more often than not merely dissipate its strength so that when the time comes for a *decisive* blow, there is nothing with which to strike it. Often merely the *threat* of the powerful armored division, held well back in reserve, will accomplish more to throw the enemy off balance than actually committing it.

What parts of the enemy should an armored division be given the mission of attacking and destroying? His artillery, reserves, higher headquarters, and his vital supply installations. Certainly if we can knock out any or all of these we have struck a decisive blow.

Now let's see just what are the mechanics of this attack. What are its various *phases*? Listed in order, here they are:

1. Planning.
2. Reconnaissance.
3. Orders.
4. Move to assembly area.
5. Security.
6. Forming for the attack.
7. Move to attack position.
8. The attack.
9. Reorganization.
10. Move to next objective or exploitation.

Every phase of the coming operation should be carefully worked out. The details of *coordination* and *cooperation* with other units involved should be thoroughly gone into and worked out. G-4's plan for *supporting* the operation must be completed and checked to be sure that it is adequate and *will work*. *Nothing* must be left to chance that can be foreseen and planned for.

Reconnaissance of the enemy position, of our final objective, and of the intervening terrain must be as thorough as the time and situation will permit. During the *planning phase*, G-2 will probably have to depend on the air and higher and front-line units to do this reconnaissance for him. But remember this: The reconnaissance carried on during the *planning stage* is only the *beginning*. Reconnaissance by the division must be continuous through *all phases* from the very beginning until the mission has been accomplished and the division brought back into a rest area. The division has the *means* for this reconnaissance in its cavalry reconnaissance squadron, the various battalion reconnaissance platoons, its light tanks, its infantry, and even its medium tanks, if necessary. *All* of these agencies must be used *constantly* and *intelligently* or the early information of the enemy, upon which success is based, will *not* be forthcoming.

To start the operation the division should get out a complete written field order and an administrative order. There is plenty of *time* and this is the best means of insuring that

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the division commanding officer's wishes are known to all. Prior to the issuance of those orders there should be a conference of the senior subordinate commanders, and *warning orders* should be issued as far ahead as possible. Once the action has started, *fragmentary* orders will almost invariably be used, as there will almost never be *time* enough to put out any other kind.

The next step is the move to the new assembly area. This assembly area should afford cover and concealment, a good road net in and exits out, and should be as near to the line of departure as possible and still be out of medium artillery range. Here vehicles are completely gassed, ammunition checked and replenished, orders issued, and any regrouping, that has not already been done, completed.

While in the new assembly area, even on the movement to this area, and in all subsequent phases of the attack, all elements of the division must be acutely conscious of the need for and assiduously enforce security measures. *Never* while in a theater of operations can an armored division fail to provide for its own security. The closer they approach the enemy, the more stringent must be their security measures. Both distant and close-in security must be provided at all times. Any armored division that fails in this can expect to find itself *surprised* and probably *defeated.* This security is provided by distant and close-in reconnaissance, by outposts and dismounted sentinels while halted, and by advance, rear, and flank guards while on the move. This applies *during* battle as well as *before* and *after* battle. Except for the distant reconnaissance, this security is normally decentralized to combat commands and the division trains; but the division commander must *coordinate all* of the measures taken.

Whenever possible the division is formed for the attack in the new assembly area. The organization and formation prescribed will be based upon the situation and the mission.

It will *move* to the attack position in either battle or approach march formation. When it has not been possible to take up the battle formation in or on the move from the assembly area, this formation will be taken up in the *attack position.* The attack position should be just in rear of the line of departure. If at all possible, it should afford cover and concealment. The *location* of the attack position must be such that the move from this position to the line of departure can be made in the *battle formation.* In this position personal reconnaissance is made by the lower unit commanders and last minute orders are issued. The *halt* in the attack position should be as brief as possible, as units of the division will be within artillery range and the enemy will probably know they are there. The longer they halt there, the more time they give the enemy to get set for them, and the less are their chances for success.

In order to reach and destroy those vital parts of the enemy which we mentioned earlier, the commanding general will probably designate a terrain objective for the division located from ten to thirty miles from the original line of departure. Even ten miles is too far for an objective to be from the line of departure, so a series of intermediate objectives will have to be designated between the line of departure and final objective of the division. By selecting a series of objectives, spaced within artillery supporting distance of each other, the artillery in the base of fire, from a position on one objective, can protect the reorganization of the tanks on the next objective. Also, these objectives being fairly close together, the infantry can quickly move up to the new objective and protect the tanks during reorganization.

From the attack position, the *attack* on the first objective is launched. Unless the division is heavily supported by artillery from other units, its base of fire would remain in the attack position and cover and support, by fire, the advance of the *striking echelon* to this objective. If the division is adequately supported by other units, then the base of fire might well follow closely the striking echelon until compelled to halt and fire. Unless immediately confronted by a fairly strong defensive position, already located and defined, the leading waves of medium tanks should be preceded by a covering force

of light tanks and/or infantry. This covering or close-in reconnaissance force should *locate* and *probe out* any resistance on the division front *before* the medium tanks have to be committed. This, of course, is in addition to any reconnaissance that the division has been able to push well out to the front. By this use of the light tanks, casualties in the main striking force are avoided, and early, detailed information is gained upon which to base the plan of attack.

Upon reaching the objective the leading combat command halts and *reorganizes*, preparatory to moving on to the next objective or starting to exploit, if the conditions justify exploitation. If the leading combat command is composed mainly of *tanks*, the accompanying infantry with this combat command is immediately pushed forward to cover and protect the reorganization of the tanks. If there is any *immediate* threat from the enemy during this reorganization, the *base of fire* will be held on the next objective in rear until this reorganization is completed, or it may start moving by echelon to the objective now held by the tanks. In any case, the second combat command would close on the leading combat command before that unit started for the next objective. As soon as the second combat command has closed, the leading combat command moves out. In case no resistance was met on the objective, the base of fire would probably be ordered to move forward as soon as the leading combat command had reached the objective. In this way the division progresses to its final objective by a *series of bounds*; all movement being covered by the fire of one of the elements in position. Also by this means the division keeps its units constantly *organized* and under control.

We are now ready to discuss the *types* of attack in which an armored division may be employed, and some *organizations*, *formations*, and *methods* which may be used in each of these types.

There are *only three* types of attack that can be made: *frontal*, *envelopment*, or a *combination of the two*. Whenever possible armored divisions use the combination.

The *methods employed* and *formations used* will depend on the *strength* and *nature* of the enemy resistance expected, and the *situation*. The armored division seeks for the *soft spots* to go through, or the *open flank* to go around. In either case, "soft spot tactics" require that we hit the enemy where he is weakest and avoid the places where he is strong and all set for armor. In order to do this, we must have well trained and extremely active reconnaissance. One other method of attack invariably used by the armored division is that of *fire* and *movement*. No element of the division moves in the attack without being covered by the fire of some other element of the division or by other supporting troops. *This principle* is carried down even into the platoons, where one section supports the advance of the other section.

Figure 1 illustrates an attack through a very soft spot—very light opposition. The situation at the start is quite vague. The division is preceded by the reconnaissance squadron pushed well out to the front. The division moves on a broad front with combat commands abreast. In this situation, organization No. 1, a balanced formation of three equal teams, would be used. Each combat command must be able to provide its own base of fire and must be able to lead with either tanks or infantry—so each combat command will have to have its own *infantry*, *tanks*, and *artillery*. With the opposition known to be this weak, each combat command would make a frontal attack and

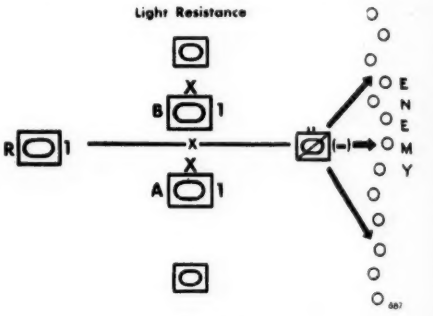

FIGURE 1.

push on through. No need to waste the time required for an envelopment.

In Figure 2 we have an attack against moderately strong resistance with a considerable amount of massed antitank defenses

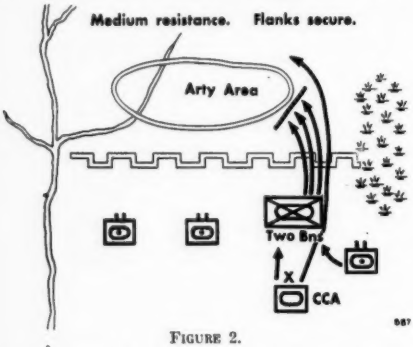

FIGURE 2.

and no open flanks. In this case, a *frontal* attack must be made. Organization No. 2, two combat commands with no reconnaissance command, would be used. The infantry of the base of fire, supported by *all* the artillery, will make the hole, the soft spot—then the striking force goes through, picking up its artillery as it moves forward. The base of fire, Combat Command B, follows and the attack proceeds. Reconnaissance squadron

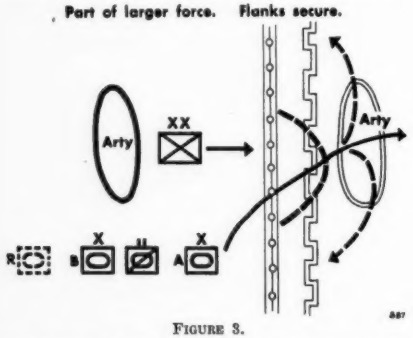

FIGURE 3.

would move just behind Combat Command A to be pushed out in front at the first opportunity.

Figure 3 shows a situation where there is a very heavy opposition, no open flanks, and strong massed antitank defenses—*no soft spots*. One must be *created* before the armor can attack. This must be done by other troops. The hole is made by the infantry division; and when it is opened up, the armored division goes through without immediate opposition and with a *decisive mission* against *vital objectives* in the hostile rear. This type of operation requires very careful *planning* and close *cooperation* with the infantry. The organization used would probably be either No. 2 or No. 3 with combat commands in column, unless our mission was exploitation. In that case, we would use the organization No. 1. If our final objective was very far, we would certainly use a series of *intermediate* objectives; and the reconnaissance squadron would be pushed out to the front as soon as we had passed through the enemy artillery.

Figure 4 illustrates a situation where the division is acting alone against strong opposition with an open flank. In this situation, the division would use a *combined* attack with

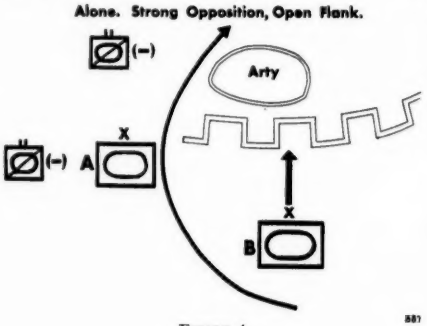

FIGURE 4.

one combat command making the holding or frontal attack while the other combat command makes an envelopment of the open flank. Either organization No. 2 or No. 3 would be used, depending on whether or not the commanding general figures he needs a mobile reserve.

Reconnaissance squadron would be used to cover the flank.

In the situation illustrated in Figure 5, the division is part of the larger force. The resistance is strong in antitank defenses but

again has a *vulnerable flank*. Here the infantry division will make the frontal attack while the entire armored division is sent on

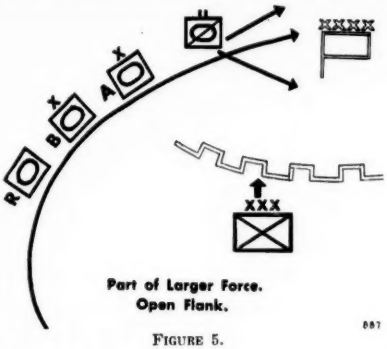

FIGURE 5.

a wide envelopment. Here the organization and formation would depend on the type and strength of opposition the division expected to encounter upon *approaching its objective*. The division would certainly move in the formation and organization the commanding general expected to use in the fight near the objective. Most likely the actual attack of the division at its objective will be a *combined attack*, so the No. 3 organization, in column of combat commands, is the most likely one here. Reconnaissance squadron would be pushed well to the front until contact was made.

In summing up we find that the main principles that govern the successful attack of an armored division are:

a. Use the *entire division* in the attack. To attack piecemeal invites defeat in detail. It takes the entire team to win a game.

b. Make every effort to secure *surprise*. Fail in this and the division will be met by massed antitank defenses.

c. Use organic and air reconnaissance *to the utmost* to gain early information upon which to base plans.

d. Make plans *detailed* and *complete*, but *simple*.

e. Make orders *brief* and *clear*.

f. Select favorable *terrain* over which to attack.

g. Be sure *supplies* are adequate to last through the attack.

h. Employ tanks in *mass*.

i. And finally, concentrate this *mass* upon objectives vital to the success of the division, and launch the attack upon this objective through the *weak spot* in the enemy position.

Engineers at Comiso Airport

"THE mission of the —th Engineers was to make Comiso airport usable by D-2. Work started on the evening of July 11th about 8 PM, the airport having just been captured by the infantry. Our reconnaissance worked with and at times ahead of the infantry in order to make a proper estimate of the work required. One grader and one D-7 bulldozer were moved onto the field under cover of darkness and put to work filling craters and clearing debris on the main runway. This work continued all night, so that at 6 AM on D-2 (July 12th) the landing strip was in shape for use.

"In bombing this airport the Allies, anticipating their later use of the field, had avoided bombing the main runway. As a result of this care, there were only two large craters on the runway to be filled. The remainder of the airport was a shambles. The work of clearing the taxiways, hard standings, hangars, etc., continued through July 16th. Two alternate taxi-ways were constructed.

"One of the most difficult tasks was the removal of bomb and shell fragments from the field. These fragments constituted a great hazard to airplane tires. Most of the fragments had to be picked up by hand. The rotary street sweeper was used to some extent, but this machine would not sweep up the smaller fragments."

An Evacuation Hospital at the Front

LIEUTENANT COLONEL EDWARD H. HASHINGER, *Medical Corps*
Executive Officer and Chief of Medical Service, — Evacuation Hospital

SOME three years ago the School of Medicine and hospitals of the —— University were asked to sponsor an evacuation hospital, and it became my assignment to direct the procurement of officer and nurse personnel and to institute their preliminary instruction. After completing a review of the Medical Military Manual, we looked about for further information to fit us better for the expected work, and on inquiry arrangements were made for a series of lectures at the Command and General Staff School. These lectures were attended by our entire staff of thirty-three officers, and the inspiration received from them provided the impetus that set our unit moving and kept it rolling during its varied and interesting front-line experiences in England, North Africa, and Sicily.

EVACUATION HOSPITAL IN NORTH AFRICA. RED CROSS MARKER IN THE FOREGROUND.

Within a few days we were ordered to camp, and the next eight weeks passed rapidly at Fort Leonard Wood. Our complement of nurses, officers, and enlisted men being now complete, we boarded a train for a port of embarkation and for overseas duty. After a pleasant and uneventful voyage we arrived in England, bivouacked in old tents in the rain for several weeks, and then had the good fortune to be assigned the task of conducting a fine new British hospital.

Here, actually at work as a medical unit, we spent about six weeks in a strenuous training program conducted over patients; we plotted operating teams, ward groups, and receiving and evacuating routines, and ironed out administrative kinks. We were ready.

The call came to move, and we went on another sea voyage—this time for the invasion of North Africa. Thus far we had never seen our hospital equipment and I assure you that this caused us no little concern, particularly for the X-ray, the laboratory, and the instruments, not to mention the tents and mess equipment. All our equipment and supplies for a 750-bed evacuation hospital were with our convoy, but on another ship. We were not permitted to have with us personally the smallest amount of equipment. Plans had been carefully made for the unloading of our equipment at the same time that our personnel was debarking. But plans sometimes go awry. The main harbor of Oran had been blocked by the sinking of two small ships, and the entire invasion convoy was forced to dock at near-by Mirs-el-Kebir. The result was that our personnel debarked and marched thirteen miles to the Civil Hospital, which we took over and conducted for four days before it was possible to get to our equipment.

The situation was not good. The hospital was crowded with casualties, and there was little to work with. Fortunately another hospital unit (— Surgical) had made a landing with equipment farther up the coast and we quickly borrowed from them such supplies as they could spare, particularly plasma, surgical instruments, dressings, drugs, and plaster.

Shortly before leaving England we had been having an epidemic of pneumonia and being fearful of an outbreak on the voyage, one of our officers carried in his musette bag a thousand tablets of Sulfadiazine done up in a sock. Our laboratory officer carried valuable reagents and instruments on his back, and our surgical officers also carried certain rare instruments. It was most fortunate that these precautions were taken. One of the first patients to come to my attention on arrival was a young officer unconscious and in convulsions with meningitis. The prompt giving of

Sulfadiazine through a stomach tube proved the emergency treatment needed to save his life. The laboratory equipment carried by our officer thirteen miles on his back made possible immediate water analysis bacteriology for the engineers. The emergency surgical instruments, similarly carried on the thirteen-mile trek, were also appropriately used.

In spite of various well laid plans, exigencies can arise to destroy each of them. Thus the blocking of the Oran harbor proved a dangerous handicap to our work. I believe that a hospital unit should never travel without a minimal equipment of drugs, instruments, and dressings, and these should be immediately available when traveling on ship, train, or land convoy, and on arrival at destination. For this there should be specially designed canvas kit bags to meet the specific needs of the type hospital, and so proportioned as to permit them to be carried on the soldiers' backs as is done by advance field units.

At Oran we had casualties, British and American, at both the Civil and the French Military Hospitals. Although the care of the patients was our biggest problem, we had much difficulty with the messing and housing of the personnel. I am sure that we could have done much better work in tents had they and the equipment been available. Buildings, particularly those of foreign construction, often look fine but serve poorly their intended purpose. After functioning continuously for one year in tents, I am convinced of their great serviceableness for the housing of a hospital, which can do first-class medical work therein.

Two weeks later, a station hospital unit having arrived, we turned our city hospitals over to them, and our equipment now having been unloaded, we set up in tents on the flats outside Oran. At last we were to see our equipment, but there were some disappointments when we opened the bales and boxes. For instance, our tentage was all old, but we had to use it. There were, of course, some valuable articles of equipment missing, but under the circumstances the entire preparation of such a large and varied group of supplies was a real accomplishment for our Medical Supply Depots.

Our first field site was low and flat. And the rains came, then the mud, then the winds with tents going down all over the camp, then the flood, and the cold, and more rain. We were being initiated. Our two greatest friends (and so far as I am concerned they rank one and two on the priority list of the United States Army) were the pot-bellied stove and the sleeping bag. We learned the finer techniques of ditching tents and how to restore a badly listing tent on a pitch black night in pouring rain with mud unbelievably deep, using stones to drive the tent pins. I said "we"—this means officers and nurses as well as men of the detachment. We were taking our first laboratory lesson in self-reliance, the development of which is necessary for an enjoyable existence in a forward field unit.

For the few weeks we were on this site we ran as high as 1,000 patients at one time. Here I saw for the first time the anxiety or mental exhaustion cases from the front—the formerly so-called "shell shock." You remember that soon after the initial North African landing some of the Allied forces made a hurried push deep into Tunisia. They apparently had not yet secured adequate air protection, and were severely strafed by the Germans. This lying in the wide open without possibility of protection resulted in some cases of anxiety state. I have never seen anything quite like it in civil practice. They came to us trembling, some deaf (hysteria), others paralyzed, some stuttering, others noisily crying out—a most depressing sight.

We treated them with large quantities of sedatives, using Sodium Amytal until deep, continuous sleep resulted.

The first week in January we were alerted. Shortly thereafter our equipment was packed for rail shipment and we started on a slow, cold trip to the Tunisian border. Several of us, officers and drivers, started overland with our few trucks loaded down with housekeeping equipment—four hospital ward tents for officers' and nurses' temporary quarters; screens for nurses', officers', and enlisted men's latrines; stoves; wood; mess equipment; and rations. We arrived first, and had a housekeeping camp set up on the arrival

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of the main group. During the trip over the mountains the train stalled near Algiers and the freight and baggage were left behind. Fortunately, we had our housekeeping unit set up for such an emergency with plenty of blankets and stoves. It was bitter cold, but we managed to keep warm without bedding rolls and sleeping bags.

We were told to bivouac, for we would move again soon to a new area where we would function as a hospital. However, the scene and tide changed. After bivouacking in this area, which was on the east side of the mountains about twelve miles beyond Tebessa on the Feriana road, we were told to set up quickly on the flat land nearby and receive patients. This we did, but it wasn't long before the onrush of Rommel so changed the picture that we hurriedly struck our camp and, with our patients, moved back about sixty miles. Here we were immediately running to over capacity.

In all our moving thus far, the Quartermaster Transportation Corps had been unable to furnish the necessary trucks, and we had to pool the equipment of a nearby Surgical Hospital, a Medical Battalion, and a Medical Regiment. Our rapid and uneventful moves were mainly due to the fine cooperation of these units.

On this move from camp to camp we started the evolution of a logistics program which, on subsequent moves, was ironed out until it became a rapid, simple, fool-proof procedure. As a basis for this, camp plans were drawn in detail, with every tent properly labeled and tent signs painted in accordance. From experience it was observed, for example, that two ward tents with complete equipment could be loaded on one 2½-ton truck. The program was published and well distributed before moving. Each truck was numbered and the titles of tents and equipment to be carried was carefully listed. The personnel that was to ride on each truck (those employed in the respective tents) crawled on top after the truck was loaded.

Six to eight hours ahead of the main groups, a group of our own trucks would go forward carrying household equipment, the emergency first aid tent, mess equipment and rations, latrine screens and homemade folding latrine boxes for the nurses' latrine, all tent signs, the camp map, shovels, rakes, mallets, and a Red Cross ground marker. The site was selected and immediate observation was made to see whether the terrain or the shape of the site would alter our previously prepared plans. A quick pencil alteration of the plans was made and they were then tacked up on a board at the entrance to the camp. Camp direction signs were now placed at nearby road intersections.

Next, the area was surveyed and each tent sign driven into the ground exactly where the right front tent peg was to go. Each truck on arriving, its exact contents being known, would drive to the correct location on the camp site, unload, and set up completely without bothering anybody else. By this means there was complete independence of action with rapidity of movement all over the camp, both in tearing it down and in setting it up. We have taken down our camp, moved a hundred and fifty miles, and set up completely for patients in eighteen hours.

After each movement, obvious errors and omissions were corrected in a newly published logistics program with which every officer, nurse, and enlisted man became familiar. This was done before we had orders to move. Every member of the personnel had a specific printed assignment in the movement, and they soon learned that by following this carefully the movement became a pleasant rather than an arduous task.

We were in camp at La Meskiana for about two months, quite busy all the time. The tide of war turned again, and we packed up and went back to the outskirts of Tebessa where we cared for a large number of battle casualties in ten days. Then we joined in the famous rapid advance of the II Corps, to which we had been assigned continuously since the invasion, and hastily moved to the shores of the Mediterranean in Northern Tunisia.

During our very busy stay at the Tebessa site, we used air transportation for a large part of our evacuation of wounded. It was most satisfactory, in spite of the fact that

we could secure planes only when they had to come to our forward area for the purpose of bringing supplies. The subsequent development of this means of transportation in the Sicilian and Italian campaigns simply prefaces the eventful use of helicopter ambulances that will pick up the wounded from the field of battle and release them at the operating room door of a fixed hospital in the zone of communications for definitive treatment.

The new site on the Mediterranean was a pleasant one. We stayed here four months, being busy most of the time.

Throughout our North African experience we constantly had adjoining us an ambulance company of either the Medical Regiment or the Medical Battalion, which brought patients in and also evacuated for us either to an air field, a railroad station, or overland to general hospitals. There were times when the scheme of evacuation would fall down, as for instance when we planned on getting out 300 by air and were told that 500 were coming in from the front—and a few minutes later we heard that the planes were grounded and we were already over our hospital capacity! Somehow or other it always worked out, by giving up our own cots, rushing in cots from the Quartermaster, borrowing more tents, etc., but our Evacuation Officer developed gray hairs daily during these tight spots.

On our move to Sicily the personnel went by hospital ship and the equipment on a freighter. *But* the freighter did not arrive for twenty-one days after we did, and we "boarded" with a very hospitable Evacuation Hospital. The plans were all made for a proper movement, but they went awry. The doctor and his tools should not be separated; the hospital and its equipment should be kept together. Furthermore, added utilities, equipment, and supplies for such a unit as ours in the field are very much indicated, such as tools for carpenters, plumbers, painters, tent repairers, etc. The planned nearby Ordnance, Quartermaster, or Engineers repair depot may not materialize.

The unit as a whole and each member of the personnel as an individual must develop self-reliance and self-sufficiency if success is to be achieved in the wide open spaces of a new field with difficult communications. We built wash machines, an ice cream freezer, fracture tables, and heating units, not to mention many other homemade devices.

While we often ran fifty percent over our capacity, officers and nurses were never unduly overworked—but the poor litter bearers took a beating! For a hospital of our size, an addition of forty litter bearers is needed. Fixed hospitals are able to utilize the help of patients, but an evacuation hospital's patients are sent out when they are able to be up and about.

The percentage of medical patients ran higher than expected. On the surgical side at least sixty percent of the work was orthopedic. A change of war front under altered circumstances could, of course, change percentages materially.

We lived in tents continuously in bitter cold and in very hot weather, and if a vote were taken today of officers, nurses, or men, it would be almost unanimous for tents over buildings. Our health was excellent. And incidentally, the nurses were the best soldiers of the lot under all the inconveniences of such a campaign as ours.

Regarding the promptness of mail delivery this system was so organized "that the mail left daily and arrived daily."

—Captain Elzéar Blaze in *Recollections of an Officer of Napoleon's Army*

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Hot Tips on Hot Weather Vehicle Operation

Prepared for the MILITARY REVIEW under the direction of the Director, Maintenance Division, Army Service Forces.

ABOUT the only thing most car owners do when summer comes boiling around the corner is to have radiators flushed, oil changed, and the "old bus" lubricated. But in the Army, things are different. Hot weather operation calls for repeated attention to numerous preventive maintenance services in order to insure reliable vehicle performance at all times.

The more important of these services have been listed by Maintenance Division, ASF, for special emphasis by all concerned in the hot months ahead, and they will probably be incorporated into a poster to be distributed to posts, camps, and stations. They comprise the following points.

Batteries must be serviced more frequently in the good old summer time because they operate at higher temperatures. This causes the electrolyte to "boil," or evaporate, faster. However, care must be exercised not to put too much water in battery cells because it will "bubble" out of the vents and accelerate corrosion of cables, terminals, and clamps.

Tires should be inflated in the morning when they are cool. Pressures will normally increase during the day due to the sun and heat generated by the flexing action of tire sidewalls. When tire pressures are checked during the day and are found to be high, they should not be reduced, or "bled," because the pressures will return to normal as soon as the tires cool off.

Cooling systems require special care. They should be flushed out thoroughly. The thermostat should be checked, and the various hose connections should be inspected and replaced if necessary. Clean, "soft" water should be used in the cooling system, and, when the technical manual for the vehicle calls for it, rust preventive should be added. The water pump must be in good condition, and the fan belt should be inspected frequently and its tension correctly adjusted.

The ignition timing should be carefully checked. Late timing, particularly, can be a contributing cause to overheating of the engine.

Accumulated grease on the under side of the crankcase tends to "insulate" it, and thus prevents the oil from dissipating its heat by radiation as efficiently as it would otherwise. For this reason, it is important that grease be scraped off.

Careful driving is also an important means of preventing overheating. Slow speeds in high gear, especially on hard, cross-country, or up-hill pulls, must be avoided. When the vehicle and fan are both operating at reduced speed, an insufficient amount of cooling air flows through the radiator. By shifting to a lower gear, the fan will speed up and provide adequate cooling.

In this connection, nearly all of us are conscious of the increased "pinging" of engines on hills that has come with the lower octane numbers of wartime gasoline. This destructive detonation, to be avoided at all times, is particularly harmful in summer when a laboring motor is always an overheating motor.

Sand and dust are generally more prevalent in the summer due to the drying effect of the sun. This makes it necessary to wash air cleaners more frequently, and, under extreme conditions, to replace oil filter elements more often.

Special attention to these summer-time preventive maintenance services will enable drivers to keep their vehicles running smoothly despite the extra stresses put on them by torrid weather. In the meantime, don't forget to keep a weather eye on the temperature gage. At the first sign of trouble, take necessary corrective action. Only in this way can the serious damage that results from overheating be avoided.

Divisional Exchange Point

Translated at the Command and General Staff School from a Russian article by Colonel N. Nesterov, Soviet Army, in *Tyl i Snabzhenie Krasnoi Armii* (The Rear and Supply of the Red Army) February-March 1943.

The translation of technical matter is especially difficult when, under rapidly changing conditions, terms acquire new uses and shades of meaning and at the same time lose some of the old.

The term "supply store" or "mobile supply store" as literally translated has several possible interpretations. It could mean a small mobile reserve, stock pile, or dump of supplies, or even a more permanently established installation, such as a depot, containing large reserves and varied stocks. Its use herein suggests that in this article it refers more specifically to a supply establishment which may include a unit or detachment of supply personnel organized and located for the purpose of receiving, caring for, and issuing supplies in the field, and in some cases it refers to the supplies themselves.

However, to avoid any possible error, the literal translation, i.e., "supply store," is used throughout and the interpretation is left to the reader, for whose convenience the term is italicized whenever it is used. It is believed the reader will have no difficulty in giving, in each case, the proper interpretation to the expression.

The mention of "artillery supply store" apparently denotes the designation of a supply branch of ammunition, and is not used in our limited sense.—THE EDITOR.

IN the original regulation concerning the divisional exchange point, only the organization for the transfer of loads from the division (or army) to the regiment was provided. The stacking of loads on the ground and the creation of *supply stores* was allowed only with the permission of the commander of the division.

Combat experience, however, indicated something else. During the battles at Lake Khasan [Siberia-Manchuria frontier, August 1938] *supply stores* appeared in the vicinity of divisional exchange points, from which the troop units, situated in positions, could replace their supplies. The battles at Khalkhin-Gol [Mongolia, February 1939], and later in Finland, confirmed the indispensability of advanced divisional *supply stores* at twelve to fifteen kilometers from the front, i.e., in the vicinity of the divisional exchange point. Towards the end of the war with the Finns these *supply stores* were finally approved and later received a table of personnel organization.

Divisions entered the War for the Fatherland against German Fascism with two *supply stores:* artillery, and food and forage. Mobile field *supply stores* permit more flexibility in the organization of the supply and transport service. Now they have received full recognition. The divisional exchange point became not only the load transfer point, but also a small base having a reserve of the basic types of loads which are necessary for the uninterrupted supply of troops.

The expediency and necessity of the establishment of field *supply stores* in the immediate vicinity of the front was not realized at once. There were many objections which, summarized, claimed that under the conditions of a war of maneuver the establishment of *supply stores* in the combat zone, when mobile transport equipment is available, is impossible, as it would interfere with the operations of units of all arms and might be captured by the enemy. Experience has upset these doubts, and now the establishment of *supply stores* in the immediate proximity to the battlefield no longer amazes anyone.

In the maneuvering period of World War I there were no field *supply stores* within the division. As an exception, they were created only during the positional warfare period, and were placed comparatively deep in the rear. The mobile reserves were then main-

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tained on wheels: combat supplies in artillery parks, and food and forage supplies on the supply transports of the division. This was dictated by the fact that in the last war all the divisional means of transportation were entirely horse-drawn, and naturally they could not assure a rapid delivery of supplies from semi-stationary *supply stores.*

With the appearance of motor transports within the division, the situation has fundamentally changed. At present, there are no special difficulties in displacing a *supply store* behind an advancing division, even though it be necessary to make two or more trips. The unloading of mobile reserves on the ground relieves the transport and enables fully its use for delivery. However, it must always be borne in mind that the accumulation in the *supply stores* of supplies which exceed the transportation capacity of the division lowers the mobility of the division. Therefore, in field *supply stores*, the supplies of the division must not exceed the demands, approaching basically the amount of supplies carried by the motor transport company of the division.

As a rule, the divisional exchange point is organized on the boundary of the divisional and regimental delivery. The location and time of organization of the divisional exchange point is determined by the division commander. He indicates the forces and means which can be assigned from the line units in order to assure the work of the exchange point. The division commander's deputy for the rear establishes the actual location for the divisional exchange point, gives directions concerning the use of personnel and matériel which are indispensable for *supply stores* and reloading, regulating of movement, organization of communication, and combat supply.

According to existing regulations, the divisional exchange point opens a mobile artillery supply dump, a mobile food and forage *supply store*, a store of quartermaster supplies, a fuel supply point for the division, and a collecting point for damaged vehicles. These are the main installations of an exchange point.

The divisional exchange point must assign loads arriving from army *supply stores* to troop units, direct these loads to army units according to orders of the chiefs of services, carry out transfers of supplies from the division and the army for transport of troop units, unload arriving transports and load transport columns going to troops, receive from troops property being evacuated, and, depending on the condition of this property, direct it to corresponding repair shops or army *supply stores.* Besides the above, during battles the divisional exchange point dispatches empty vehicles for the evacuation of the wounded.

When arranging for the opening of the divisional exchange point, it is necessary to inspect the terrain, divide the selected area into sectors corresponding to the subdivisions of the exchange point, place traffic regulating posts, organize a guard, and set up outer and inner communications. The divisional exchange point may begin to operate right after the mobile *supply stores* unload from the transports the loads assigned to it. In some cases the *supply stores* begin to operate immediately upon arrival in designated sectors, issuing supplies right from the transport. It usually requires from two to three hours for placing the divisional exchange point in complete readiness.

The chief of the divisional exchange point is appointed by the division commander's deputy for the rear and is responsible directly to the latter. He has no units assigned to him. He has the right, however, of disposing the personnel of the motor transport company and of making use of the personnel and means assigned by the division.

The chief of the divisional exchange point, by order of the division commander's deputy for the rear, organizes the exchange point; selects areas for the disposal of mobile *supply stores*, the fuel distributing point, and the collecting point for damaged vehicles; points out a place for the divisional motor transport company; searches for suitable

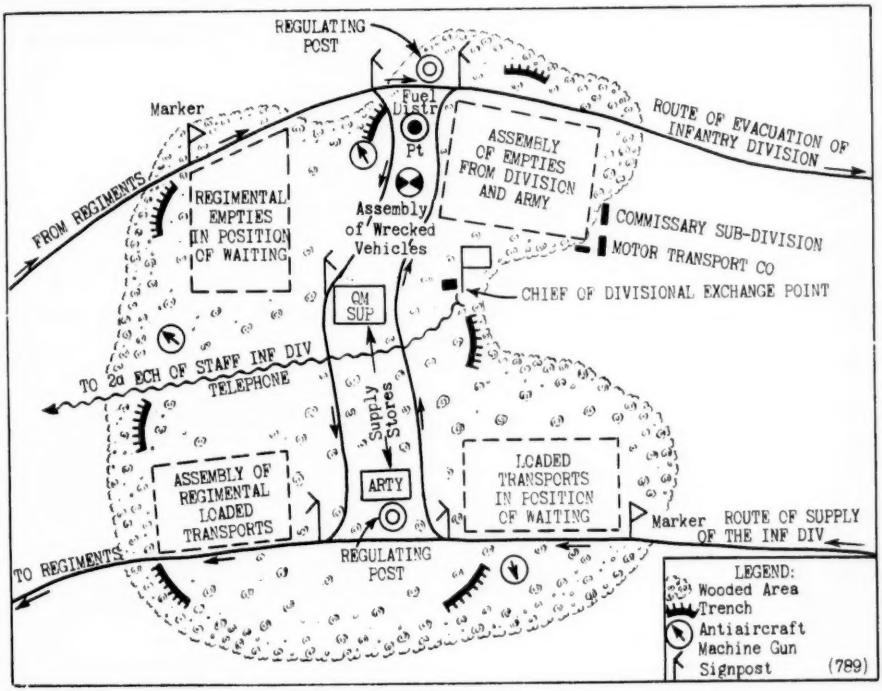
areas for receipt of loaded supply transport vehicles and assembling of unloaded vehicles; organizes a service for regulating the traffic and communications in the vicinity of the exchange point; organizes the guard and the defense; and finally, indicates points for the distribution of various rear establishments (artillery parks, veterinary hospitals, etc.) which are not part of the exchange point but which are disposed in its vicinity.

As the basic establishments of the divisional exchange point are moved about by the motor transport company, it is natural that the chief of the divisional exchange point should be the commander of the divisional motor transport company, as is usually the case. In some instances, a special commander is appointed as the chief of the divisional exchange point, who at the same time functions as the commander of the troops that are in the vicinity of the exchange point.

Material means are assigned to troop units by chiefs of supplies and services. They also direct the supplies which are being evacuated to the rear *supply stores*. The chief of the divisional exchange point, guided by reports of the chiefs of services of the division and by directives of the division commander's deputy for the rear, arranges transportation and establishes the sequence of delivery and evacuation, as well as the use of returning empty vehicles (divisional and army).

When the division receives a great quantity of supplies during short periods of time and issues them to troops promptly, then the divisional exchange point represents a comparatively complex organization extending over a wide territory. The arrangement of such an exchange point is shown in the sketch.

However, under ordinary circumstances, and even during moments of comparatively



DIVISIONAL EXCHANGE POINT.

intensive delivery, the organization of the divisional exchange point can be considerably simplified. When delivery not exceeding the capacity of the divisional motorized transports is accomplished, instead of general areas for concealing the arriving transports, small special areas are set off for each *supply store*, and all the subdivisions of the exchange point are distributed at short intervals but with consideration for the requirements of antiaircraft defense. Such a disposition of the divisional exchange point considerably simplifies the control, requires less territory, reduces to a minimum the expenditure of strength and means for communication and the regulation of movement, and is suitable for security and defense. The simplified exchange point can be easily situated in a small populated place.

If at the divisional exchange point general areas are available for waiting, then the loaded transports arriving from army *supply stores* are first directed towards the areas for waiting of divisional and army transports, whence they proceed for unloading to the mobile *supply stores*, or directly to the troop units. A similar movement is also accomplished by the arriving troop transports, only at first they are disposed in the waiting area of empties of troop units, and later they are called through the traffic regulating elements to the mobile *supply stores* for loading. Having received the loads, the transport of the troop units proceeds to the assembly area and from there to the respective units.

At the simplified divisional exchange point, the division (army) transport, and that of the troop units, is directed immediately to the sector of disposition for its particular mobile *supply store*, where it is placed in the concealed place reserved for it. Having received the loads, the troop transport is directed to its unit, but that of the division, after unloading, goes to the parking lot of the motor transport supply company.

Organizing the movement of transports in the vicinity of the exchange point, the chief of the divisional exchange point must not allow the obstruction of their flow, and if possible must avoid movements in the opposite direction. He must bear in mind that in the areas of waiting and at the *supply stores* the transport must be well camouflaged against aerial observation and must not be stationed on the roads. It is very essential to camouflage the roads which disclose the organization of the exchange point and its approaches. It is also necessary to camouflage the loads in the mobile *supply stores* and the work of loading and unloading of transports. Food as well as quartermaster supplies may be placed in dugouts.

As the troop units move forward, their rear subdivisions must be shifted correspondingly. The divisional exchange point is moved when the distance to the troops has so increased as to make more difficult the delivery of supplies. The order relating to change of location of the divisional exchange point is issued by the division commander's deputy for the rear. The transfer is carried out in the following sequence: In the beginning the command with means for regulating the movement proceeds to the new place. In the new location, places for the *supply stores* are selected, areas for concealing loaded and empty transports are laid out, and roads are improved and marked. If the situation permits, it is possible, before the relocation of the divisional exchange point, to organize temporary intermediate reloading platforms, mainly for ammunition; it is sometimes expedient to move forward the entire mobile artillery *supply stores*.

It is best for the chiefs of supply—artillery, food and forage, and quartermaster—to billet together with their equipment immediately in the vicinity of the mobile *supply store* within their jurisdiction (fuel distribution point) [exact translation]. That enables them to solve all problems of delivery, equipment, control, calculation, and accounting right in the vicinity of the exchange point. It is also expedient to dispose the attached repair shops (artillery, quartermaster, motor transport) in the vicintiy of the respective mobile supply store. It is possible to dispose

there the auxiliary repair shops set up by the division for serving the troop units: shops for repair of shoes and clothing, repair of leather equipment and harness, repair of field trains, and other shops.

The protection of the divisional exchange point consists mainly of the divisional motor transport company, and also of forces and means especially assigned to it for that purpose from the units of the division. The guarding of stores at the divisional exchange point is organized on the basis of interior protection of troop units. For the more valuable stores a sentry is posted. All other goods are watched by a posted guard. Independently of the interior protection of stores, the chief of the divisional exchange point must establish direct security corresponding to the field service regulations. The personnel and the disposition of the security is determined by the distance from the enemy, the size of the guarded object, condition of terrain, and visibility. Basically, these will be field sentries.

If other rear units and establishments are situated in the divisional exchange point and there is a general garrison commander of the given area, the measures for direct security are taken by the latter. In this case the security of the exchange point will be a part of the general plan of security.

The defense of the divisional exchange point is carried out by all forces and means at the disposal of the commander. The entire personnel of the division exchange point, as well as the individuals found temporarily in its vicinity, regardless of specialty and duty, participate in its defense in case of attack by the enemy. The chief of the divisional exchange point establishes a plan of defense in advance, carries out a combat plan based on his personnel, designates the firing positions, and assigns each man a particular spot in case of a battle alert. Troop units assigned for the protection of the divisional exchange point participate in the defense on the basis of general regulations.

When there is a common garrison commander in the area where the divisional exchange point is situated, the defense is executed according to his plans; in this case the defense plan of the divisional exchange point is part of the general plan. The organization of the defense depends upon the forces, means available, and conditions of terrain, but basically the defense of the exchange point should be an all-around one.

For better defense organization it is desirable to situate the divisional exchange point in an area inaccessible or difficult to approach with tanks, and later on to strengthen it. If it is impossible or inconvenient to situate a divisional exchange point in an area inaccessible to tanks, it is necessary to foresee a transfer to such an area when under threat of hostile attack. The order of transfer, and the contemplated area are prepared beforehand, and particularly the sequence of the transfer of loads is established in advance.

The commander of the divisional exchange point must communicate not only with the headquarters of the rear of the division, but also with the nearest other rear units and establishments, and with the chiefs of halting places (military police districts). He must be well acquainted with the orders of the staff of the division for combat security of the rear area.

Antiaircraft, antichemical, and antitank defenses are organized on the basis of general regulations. Decentralization of loads and their careful camouflage, shelters dug in advance for personnel and transport—these are the basic means of antiaircraft defense. It is also necessary to observe other means of caution. At night, in the vicinity of the exchange point, vehicles must proceed with dimmed or extinguished headlights. During loading and unloading the headlights are extinguished and lights are not put on. The personnel of the divisional exchange point must be accustomed to work in darkness, know the locations where loads are kept, and be able to handle them at night.

In case of a chemical alert it is necessary to appoint observers for immediate signaling of information to the personnel of the di-

visional exchange point, and to maintain in full readiness the individual means of chemical protection.

At the appearance of small enemy detachments and groups, the personnel of the divisional exchange point must repel the attack and destroy the enemy in battle; in extreme cases the enemy must be kept engaged until reinforcements are brought up.

During the present war many new things have been brought into the organization and service of the rear. Particularly, the character of the divisional exchange point, as well as the place of transfer of loads from the divisional or army transport to the regimental transport, has been changed. In actuality, the divisional exchange point represents a group of field *supply stores* on the ground from which the division replenishes the stores of the troop units engaged in combat.

In varying conditions of combat situation the structure of the divisional exchange point may be developed and simplified. In the majority of cases a simplified scheme is applied through which it is possible better to organize the administration as well as the security and the defense. Depending on the intensity of the delivery, the question as to the chief of the divisional exchange point is also decided. Experience has shown that in ordinary delivery, not exceeding the transport capacity of the divisional motor transport company, the commander of the latter may be designated as chief of the divisional exchange point.

The divisional field *supply stores* are closer to the advanced front lines than the others. Under these conditions the security and defense of the divisional exchange point, as well as the camouflaging of loads and of interior and approaching roads, assume exceptional importance. A properly organized security and defense in the vicinity of the divisional exchange point avoids a loss in personnel and matériel when attacked by separate infiltrated units and groups of the enemy.

Blood Plasma in Jungle Operations

FROM the Southwest Pacific a Division Surgeon reports on the use of blood plasma in combat:

"Here is an example of what was done in one battalion aid station. One day while the unit he was with was cut off from evacuation and supplies, one of our medical officers was confronted by a case of a badly lacerated arm. The forearm was just hanging by shreds from the elbow. Unfortunately the medical officer had no surgical instruments and was pinned down by machine-gun and mortar fire with his patient. However, he did have dressings, plasma, ether, alcohol, and some 'C' ration cans. He performed an amputation with a hand ax, after cleaning it with alcohol; he then 'salted' the arm down with sulphanilamide, and during the course of forty-eight hours gave six units of blood plasma.

"When the soldier arrived at the clearing station later he was in good shape. His temperature was under 100°, his pulse was good, and he lived. This was a case where plasma did a great deal of good. I am sure that this patient would not have lived if these measures had not been taken.

"There have been many other instances where several units of plasma have been given in forward areas before the patient had been transported to the clearing station."

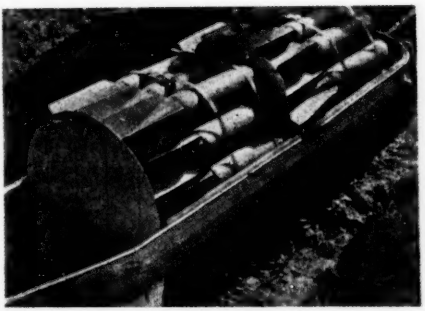
The test of a man's courage is responsibility.

—Lord St. Vincent

MILITARY NOTES AROUND THE WORLD

GERMANY

New German Bomb:



The new German bomb, similar to the Russian bomb first reported by the Finns, contains in its shell a number of small fragmentation bombs. Upon the explosion of the "mother," which can be controlled, the small bombs are uniformly scattered.

(*Signal*, Germany)

Heat Cushions:

Chemical heat cushions for protection against cold are extensively used by the Germans. When a little water is poured on the contents of the cushion, which consists of ammonium salt and iron powder, it warms up to about ninety degrees Fahrenheit and maintains this temperature several hours. These cushions have proved extremely valuable in the transportation of wounded in winter.

(*Hamburger Fremdenblatt*)

Radio-Controlled Tank:

This miniature tank, loaded with explosives and controlled by radio, has been used by the Germans both in Italy and in Russia. The Germans call it *Grabenwolf* or "trench wolf." The picture above is an official German photograph.

(*Signal*, Germany)

Another more or less "secret" weapon has been turned loose by the Germans. It is a ground-hugging, remote-controlled tank carrying 1,000 pounds of high explosive to its target, where it can be exploded at will.

Each of the tanks bears antennae that link it to human control. Unlike the glider bomb, it does not explode on impact but depends on the pushing of a button. But if hit by a shell, the tank will explode before reaching its target.

A number of these tanks have been knocked out by Allied artillery.

(*The New York Times*)

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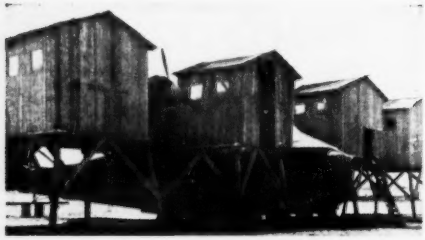
Repair Shops on Stilts:



These wooden sheds on elevated platforms are pushed over the motors of the German "Giant" transport plane (Me 323) enabling the mechanics to work at motor repairs and adjustments regardless of cold or bad weather.

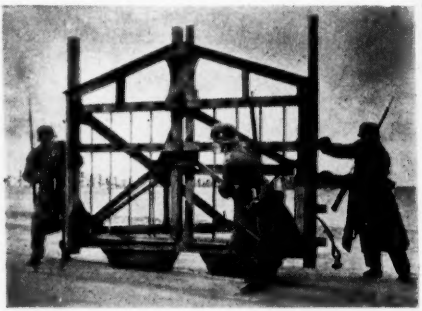
(*Berliner Illustrierte Zeitung*)

The New Junkers 188:

Developed from the Ju 88, one of the Luftwaffe's most successful bomber types, the new German raider, Ju 188, retains many of the characteristics of its forerunner. The main difference is in the engines, the twin Jumbo liquid-cooled motors of the Ju 88 having been replaced by twin BMW 14-cylinder two-row air-cooled radial motors of increased power, each developing 1,530 horsepower at 20,000 feet, which gives the new bomber a speed of 325 miles per hour. It has a bomb-load capacity of 7,700 pounds, compared with the maximum load of 6,400 pounds carried by the Ju 88, and representing about half the load of our four-engined bombers. The Ju 188 has an increased wing-span, and its bomb racks are arranged to carry 250-, 500-, 1,000-, 1,400-, or 1,800-kilogram bombs. The nose and cockpit cover have been remodelled following latest German practice, and the four members of the bomber's crew have a little more space, though they are still crowded if judged by Allied standards. An electrically operated turret above the cockpit mounts one (sometimes two) 13-mm machine gun, additional armament including a fixed 20-mm cannon in the nose and other guns in the dorsal and ventral positions. The crew's quarters have very strong armor protection; the usual armor plate beneath the nose of the fuselage can be jettisoned at will; and armor protection is provided for the twin motors.

(*The Illustrated London News*)

Mobile Antitank Barrier:



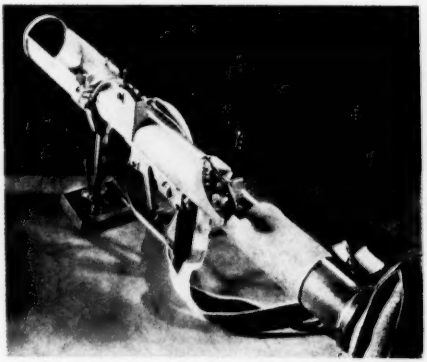
The photograph shows a section of the mobile antitank obstacle used by the Germans in their Atlantic Wall fortifications.

(*Stuttgarter Illustrierte*)

GREAT BRITAIN

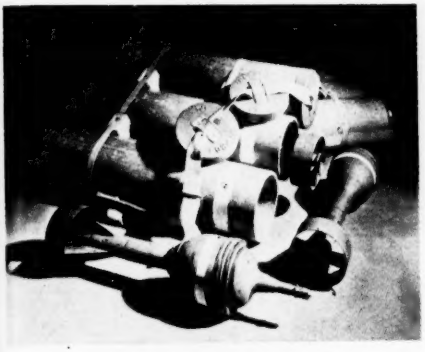
The Piat:

A powerful new lightweight infantry weapon, comparable in function to the American bazooka, has been developed by the



THE PIAT COMPLETE.

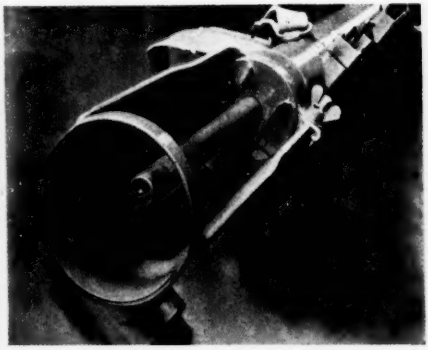
British. The 33-pound weapon, known as the "piat" (from the initials of the official name, "projector, infantry, antitank") fires a 2¾-pound bomb which, it is claimed, can pierce four inches of the best armor plate with the



PIAT BOMBS AND THEIR CARRYING CASES.

force of a 75-mm gun. It has been successfully tested in combat by Canadian troops in Italy, where it was found to be especially effective in close fighting against tanks and pillboxes.

The weapon is easily carried by one man and can be brought into action within a few seconds. A spring mechanism takes most of the recoil so that it can be fired from the shoulder with the forepart of the weapon rested. Used in this fashion, it can disable a moving tank at a range of one hundred yards. With the butt placed on the ground so as to give the barrel elevation, the piat can knock out enemy transport, machine-gun nests, and similar targets at ranges up to 350 yards.



MUZZLE OF A PIAT WITH ITS BOMB PROJECTED. THE FIRING SPIGOT IS SHOWN SHOT FORWARD BY A POWERFUL SPRING.

Its bomb is filled with high explosives which detonate on impact with the target. The propellent force is derived from the explosion of a cartridge in the tail assembly. The main part of the weapon is a light steel tube enclosing a spring developing 200 pounds' pressure. When released, the spring carries forward a steel rod which fires the cartridge in the tail of the bomb; the resulting explosion propels the bomb and at the same time recompresses the spring, automatically recocking the weapon.

The piat is being produced in Britain in quantity and has been introduced into Canadian training camps.

(*Army Ordnance.* Pictures from *The Illustrated London News.*)

New British Armored Car:

The British announced that they had developed a twelve-ton armored car equipped to fire an antitank six-pounder while rumbling along at from eighteen to forty-two miles per hour.

Called the "EAC Armored Car Mark II," the radio-equipped vehicle also mounts machine guns. The crew of four is protected by armor plate an inch and a quarter thick at the front and one inch at the sides.

Described as the "biggest, most powerful British armored car yet seen in service on any battle front," it is powered with a Diesel engine.

(*The New York Times,* 21 March 1944)

Helicopter for Evacuation of Wounded:

According to Algiers Radio, the use of helicopters for evacuating badly wounded men from high mountain positions in the Italian battlefield is being considered by the Medical Corps. Transport of wounded in these areas is a long and difficult task, with a result that serious cases may die before reaching a forward casualty clearing station.

Helicopters might land within a few yards of the wounded and carry them to hospital in a matter of minutes. The only trouble here is that a helicopter could only carry, at the most, two cases at one time.

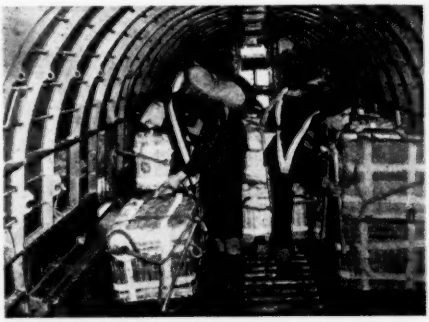
(*The Aeroplane*, Great Britain)

For Delivery by Parachute:

Men of the air delivery section of Britain's Royal Army Service Corps are trained in the packing of all types of supplies—food, ammunition, weapons, medical supplies, and countless sundries—in special panniers and in

500-pound bomb cases to which parachutes are attached. A folded parachute can be seen in the picture above, in the foreground to the left of the bomb case.

Supplies are packed into delivery aircraft and the RASC men travel with them, making certain that they are launched at their various delivery points—sometimes a camp difficult of access by road, and sometimes, in the battle zones, a section of troops cut off by the enemy. The bomb cases are usually carried in racks beneath the fuselage, but the panniers are packed inside the aircraft as shown



in the photograph, whence they are pushed out along a track consisting of rollers.

(*The Illustrated London News*)

BRAZIL

Brazilian Army:

Dr. J. J. Moniz de Aragao, Brazilian Ambassador to London, recently declared that Brazil has 300,000 troops prepared for overseas operations. While no official War Ministry figures on the army's size have been released, it might be well to remember that, based on the eight to ten percent military manpower estimate, Brazil could muster a large fighting force from its 43,000,000 population. Obstacles, however, lie in providing adequate modern equipment, cantonment areas, experienced instructors, and transportation.

(Brigadier General John N. Greely in *The Quartermaster Review* March-April 1944)

SOUTH AFRICA

Pilot Training:

More than 5,000 pilots have been trained in South Africa under the Joint Air Training Scheme, together with about 2,000 navigators, 2,000 bomb aimers, and 2,000 air gunners.

(*The Aeroplane*, Great Britain)

U.S.S.R.

Decorations for Women:

The Soviet Government has decorated 45,000 women with orders and medals. Of this number, 2,300 women guerrillas wear the "Guerrilla of the Patriotic War" medal.

(*Information Bulletin*, Washington Embassy of the USSR)

Ampulla Mortar:

The Soviet ampulla mortar (Russian term: *ampulomyot*) was developed from a device for hurling incendiary bottles. It resembles a trench mortar in construction and appearance. It fires thin, spherical, sheet-metal containers (ampulla) filled with a self-igniting mixture. The container breaks when it hits the target. The weapon is used against tanks and living targets. Maximum range is 300 meters.

(*Taschenbuch, Russisches Heer*, Germany)

JAPAN

Quality of Japanese Weapons:

Tests have disclosed that the latest Japanese rifle, a manually operated bolt-action weapon with an increased bore of caliber .303, is inaccurate at a range of more than 350 yards, while the American M1 rifle, the Garand, is accurate at greater distances.

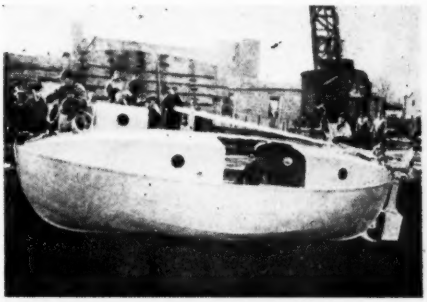
It has been found that the Japanese light machine gun fires thirty rounds in three seconds, but, since it has only a thirty-round magazine, its effective rate of fire is reduced to 200 to 300 rounds a minute. It is accurate at short distances, but at 500 yards it does not compare with the caliber .30 Browning, which fires 500 to 600 rounds a minute.

According to Major General G. M. Barnes, chief of the Ordnance Department's Technical Division, "Jap infantry weapons are very light and portable and can be carried into the thickest jungles. However, they lack firepower. The Japs are not good artillerists, and their artillery weapons cannot be classed as satisfactory, except perhaps for fighting under jungle conditions. They are not strong in the engineering of automotive vehicles and are failing to keep pace with American automotive developments. The quality margin between our weapons and the Japanese will grow wider as the war progresses."

(*Army Ordnance*)

UNITED STATES

Unsinkable Lifeboat:



This vessel is the first of its kind to be built. It was launched last November in Delanco, New Jersey. The almost totally enclosed vessel weighs two and a quarter tons and is twenty-four feet in length. It can accommodate twenty-five persons, and can be driven by motor or by sail.

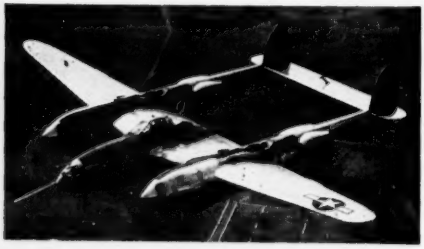
(*The Sphere*, London)

Cooking Dehydrated Foods:

Foods of the dried or dehydrated type, particularly eggs, milk, and vegetables, are important components of the expeditionary ration (Field Ration B) and require proper preparation in order to make them palatable. A War Department publication, "TM 10-406, Cooking Dehydrated Foods," published 22 November 1943, is a definite aid in this regard for mess personnel and officers concerned with the supervision of messes. The manual contains about fifty recipes for the preparation of dried and dehydrated foods, in addition to general information on the subject.

(*The Bulletin of the U. S. Army Medical Department*, April 1944.)

New Super-Range P-38 Lightning Fighter:



Shown above is the twelfth improved model in the line of fighting Lockheed Lightnings. It flies faster, higher, and farther than any Lightning has gone before. Powered by two Allison V-1710 engines, the new P-38 is thirty percent more powerful and has thirty percent more fighting range.

(*U. S. Air Services*)

The P-38 Lightning—A British Account:

One of the most successful fighter aircraft produced by our American allies, the Lockheed P-38 single-seater Lightning, is also one of the most unorthodox designs to have gone into action, its twin booms making it conspicuous in any company [see picture above]. Until the Allied invasion of North Africa, the Lightning had been used operationally only in the Aleutians. Untried in battle, it showed up well in the fighting that drove the Luftwaffe from the Mediterranean skies, and soon afterwards distinguished itself in the Pacific zone. More recently it has been detailed to escort the powerful forces of Fortresses and Liberators which pound Hitler's Europe in daylight, and has done much to reduce their losses. In spite of being the heaviest of the U. S. fighters—it weighs approximately seven tons—it is one of the fastest of their combat planes. Designed as a long-distance escort, its twin 1150-horsepower Allison motors, mounted at the front of its tapering booms, give it a speed of 360 miles per hour and a range of 1,000 miles. Additional range on long-distance flights is obtained by the use of two detachable "spare" fuel tanks carried beneath the wings. Its powerful armament of one 20-mm cannon and four half-inch machine guns is closely grouped in the nose of the projecting central nacelle forward of and below the pilot's cockpit—a terrifying concentration of fire power which enemy pilots have learned to respect. Popular with the airmen who fly it, the Lightning, in spite of its departure from conventional design, has earned its place among the leading fighter aircraft of the war.

(*The Illustrated London News*)

SWEDEN

Sweden's Increasing Armament:

The Swedish army and air forces have been systematically raised to a higher degree of preparedness, and it is said that the less exclusive replacements in the officers corps and the raising of the status of the noncommissioned officer have brought about a change in the ranks of the professional soldier.

The Minister of Defense hopes to complete the naval armament plan by 1 July 1947. The Swedes desire above all to increase the number of lighter units, but in the case of the heavy class they are contenting themselves with the seven or eight coastal vessels, three of which are modernized with heavy artillery (28-cm). As for cruisers, two are under construction, which will bring the total number up to four. There is also an airplane carrier. Destroyers and torpedo boats have been increased to twenty-seven by the construction of seven medium and four small ones and by the purchase of four others from Italy. In addition, two large ones are under construction or planned. Mine layers and mine-sweeping vessels, twenty-one speedboats, and twenty-seven submarines complete the fleet. All things considered, this signifies a considerable strengthening of Swedish naval power.

(*Hamburger Fremdenblatt*, Hamburg, Germany, 19 February 1944)

FOREIGN MILITARY DIGESTS

The German Supply Problem In Italy

Translated at the Command and General Staff School from a German article by Clemens Podewils, War Reporter, in *Deutsche Allgemeine Zeitung* 20 February 1944.

SUPPLIES reach upper Italy through a few passes only, and there are essentially but three railway lines serving as main traffic arteries to the south. One of them follows the Adriatic, the other the Tyrrhenian coast, and the third, between Bologne and Florence, breaks its way across the crest of the Apennines. And so it seemed to the enemy that the first thing to do was to block the supply lines of the German divisions who were waiting far to the south for the landing of the Allies. It is well known that at that time strong forces of the Italian Army were stationed within threatening distance of the Brenner railway. But it is a fact that is less well known that the then General of the Italian Transportation Service, di Ramondo, even in August, under various pretexts, decreed a ten days' blockade of German traffic over the Italian railways. As we look back in the light of the events of 8 September, the secret is unveiled in these measures. They were intended to produce a shortage of motor fuel, thereby putting our mechanized forces in Calabria, at Salerno, and in the whole of Italy out of action.

This danger was met by the German command without delay. By bringing into action what means of transportation there were available, a shift was made from the railroads to motor trucks in the case of the most important items, and German supply trains started rolling over the highways toward the south.

That first serious transportation crisis, which the Germans were able to meet by immediate action, was the proof of the problem. What the enemy had undertaken then in an underhand way, he now was to be obliged—since that method had failed—to try to accomplish by force of arms. Day after day his air forces directed their attacks against the German supply lines. Since the beginning of the year, the enemy has intensified these attacks wherever possible. He hopes in this way, by crippling the railway service, to deprive the front of a steady flow of fresh forces, ammunition, motor fuel, food, and other supplies. If General di Ramondo is serving today as minister of railway transportation with the Badoglio government, it may be regarded as a proof that the Allies hope to possess in him a qualified adviser in their work of destruction in Italy. Notwithstanding all this, German railway troops, reinforced by native labor, are ceaselessly at work repairing damaged railway property. But where the lines are really knocked out for a considerable period of time, the gap is bridged by the intensified employment of motor transport trains. For a long time now, motor transport columns and their drivers have borne the main burden of the supply problem in central Italy. The credit for being

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able to provide a satisfactory substitute method of handling the Axis supply problem goes to the command which in this sector of operations has been able to thwart completely the plans of the enemy. This has been possible by skilful management of the available tonnage and by its more careful employment, but particularly by speeding up of the rate of travel. In this way the distances between the northern Italian bases and supply centers of the rear army areas of the southern front were bridged. So-called emergency carriers were employed to carry the supplies from here on to the fronts. This included the transportation facilities of the mechanized troops, which, in a period of purely defensive operations, are not needed and can be used for transportation of supplies.

The supply troops, especially the men of the supply and motor transportation companies, are faced with an extremely difficult task in this stubborn battle against air adversaries. These troops have charge of the transfers of cargoes, of loading and unloading. When we learn that the daily average for a man is four tons of cargo, we obtain a good idea of the physical effort involved. The drivers make their trips after dark. But supplies must sometimes be rushed and it is necessary to continue the journey by day. They are continually exposed to bomb attacks. In the front area, even the safety lights are extinguished in order not to afford a target for enemy artillery. Also, the clear skies of the south are not found over mountain passes and highways, but snow drifts and ice-covered roads slow the journey and make it a task that is highly fatiguing to both mind and body. In many instances, the work of the motor transport drivers stands fully on a level with that of the fighting forces. They perform their task in the consciousness that the existence of their comrades on the front depends on their bravery and endurance.

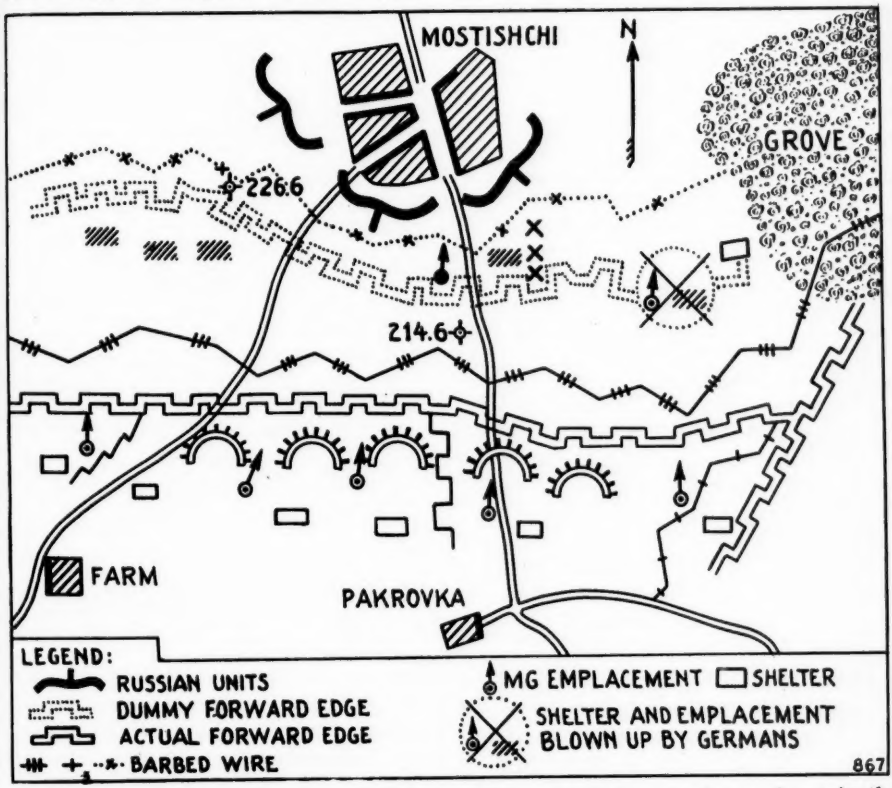
The enemy may make trouble for the supply service but he is just as far as ever from his goal—the blocking or destruction of the lines carrying supplies to the German front. He has in the German too persevering and, from the standpoint of organization, too gifted an adversary, one who has always been able to get all his supplies, from shells to surgical dressings, to the front. When, therefore, the hostile air force at the time of the landing at Nettuno doubled its attacks on our supply lines, the German command, in spite of this, surpassing even their past accomplishments, were able immediately to effect an impressive movement of German divisions into the Italian area. Infantry, artillery, tanks, and the necessary ammunition soon arrived at the bridgehead, around which our troops and weapons established themselves like an iron ring. It is an important fact that even in those areas where the principle of economy does not permit of the employment of more forces, nevertheless, the fronts are holding and the flow of supplies is being constantly maintained.

But the problems in Italy are occasioned not only on account of the threat from the air but also by the necessity for keeping supply columns and supply centers hidden from the view and protected from the guns of the enemy. The nature of the terrain calls for special measures which are necessary for assuring the supplying of the troops. In the western area at some of the points of main effort of the enemy's attacks the front passes through ranges of mountains, the highest of which, Mt. Cairo northwest of Cassino, reaches a height of nearly 1,700 meters. In the central sector, the operations bear the character of high altitude mountain warfare. Porters and pack mules, which travel over snow-covered and icy trails carrying ammunition, food, and clothing to the front lines, replace the horse-drawn or motorized columns. Here also, the night and semi-darkness must be employed to avoid heavy losses as a result of the enemy's artillery fire which is everywhere very strong. The wounded, when able, are brought back on the backs of those pack animals able to bear their weight. Serious cases are brought to the main dressing station on special mountain stretchers.

Reconnaissance In Force by a Reinforced Rifle Company

Translated at the Command and General Staff School from a Russian article by Lieutenant Colonel Sharonov, Soviet Army, in *Voyennyi Vestnik* (Military Journal) July 1943.

IN ORDER to determine the actual outline of the enemy forward edge south of Mostishchi, the commander of a certain infantry division decided to use reconnaissance in force. This mission was assigned to a rifle company reinforced by two squads of sappers and a squad of tommy gunners. The company was to overcome the wire entanglements, occupy Hill 226.6, and then advance toward Hill 214.6.



The plan of action was as follows: During a three-minute artillery attack on a wide front (intended to confuse the enemy as to the actual direction of attack) the company was to rush, by platoons, through the previously prepared passages in the German wire entanglements; to drive the enemy from Hill 226.6; to occupy the trench, and, without halting, to advance to the southeast in the direction of Hill 214.6.

The company was to be supported by a battalion of the division artillery, regimental artillery, and a mortar battalion. Besides, one volley was to be fired by the division mortars. This volley was to be a signal for the beginning of the attack.

Possible enemy counterattacks were to be countered by the adjacent companies. For the same purpose, a reserve battalion was brought into readiness.

For several days before the operation an uninterrupted observation of the enemy was conducted. During this time, the company was given some training in movements through narrow passages in wire entanglements, and in grenade throwing. A number of lessons were also given in hand-to-hand fighting in fire trenches and in communication trenches.

At night, several hours before the action, the sappers succeeded in making passages through the enemy wire entanglements (one per platoon) from four to six meters wide. They guarded these passages till the moment of the attack.

At dawn, the infantrymen and the tommy gunners stealthily occupied the position of departure for the attack. It was from twenty to thirty meters from the wire fence. Each platoon was in position in front of its own passage.

Soon our artillery and mortars opened fire on a wide front. By direct hits, a number of shelters and timber-and-earth emplacements were destroyed on the forward edge of the enemy. Fire and communication trenches were also damaged.

At last the division mortars fired a volley. That was the signal for attack. The platoons arose and with a quick rush broke into the first trench. It was empty. The enemy was in the other trench located from fifty to seventy meters from the first one (a dummy forward edge of defense). In front of the actual forward edge (the second trench) and at a distance of twenty to thirty meters from it, there were three rows of wire entanglements. As soon as the fighters broke into the first trench, the Germans at once opened fire from the second trench and from covered machine-gun emplacements right behind it. Besides, three 81-mm mortar batteries located beyond Hill 214.6 and in the grove, and a number of artillery pieces in Pakrovka and in the farm opened fire on the approaches to the actual forward edge and on the first trench.

Because of this fire, the platoons were forced to halt. They took cover in the trench and started a fire fight.

Taking advantage of the fact that the attention of the enemy was directed at the fighters who were in the trench of the dummy forward edge, a group of tommy gunners and infantrymen, which had been selected beforehand, ran toward the shelter and the covered emplacement located between the first trench and the actual line of defense. As soon as they had approached the objectives there was an explosion, and both the shelter and the emplacement flew into the air [indicated by crossed lines on sketch]: all the emplacements of the dummy forward edge contained controlled mines.

It should be noted that during the action of our rifle company, the enemy was continuously observed from the main and alternate observation posts. This enabled us to determine the location of the main firing positions of the enemy on the actual forward edge, as well as the firing positions of his mortars and artillery.

Inasmuch as the main mission of the reconnaissance had been accomplished and any further advance of the company would have resulted in considerable losses, the commander of the division ordered a withdrawal. The withdrawal was accomplished under cover of machine-gun fire, mortars, and artillery. The company suffered some losses, however.

The results of this action were as follows: The trace of the forward edge was determined. Its fortifications consisted of a continuous trench with a number of communication trenches toward the rear, several rifle pits, covered machine-gun emplacements and shelters situated behind the trench, and three rows of barbed wire.

It was also established that the shelters and the emplacements beyond the second trench were well camouflaged and only slightly raised above the ground, while the em-

placements between the two trenches were silhouetted against the background and poorly camouflaged. These latter were not manned at all. There were only a few soldiers with tommy guns and machine guns in the first trench. They conducted fire from a number of firing positions. The position as a whole was defended by relatively small forces. Most of the defenders were armed with automatic weapons.

Cavalry In This War

Translated at the Command and General Staff School from a German article by Lieutenant Colonel Benary, Retired, in *Münchner Neueste Nachrichten* 14 March 1944.

IN RECENT weeks, the official German communiqués have repeatedly mentioned encounters with powerful formations of Soviet cavalry as well as successful operations by cavalry units of our own.

After the First World War, in view of increasing motorization, debate was rife regarding the justification of the further employment of cavalry. England, except for a few squadrons of cavalry in her home army for parade purposes, had given up cavalry completely in favor of motorized troops. France was engaged in transforming her cavalry regiments into motorized units (*dragons portés*). Soviet Russia, who, in her revolutionary wars and her Polish campaign, had had good results with her mounted forces, clung to powerful cavalry formations. Poland and Rumania followed her example. Italy chose a middle course. Germany, by the treaty of peace which had left her relatively powerful cavalry forces (because they were allegedly harmless) but which had imposed close restrictions on its motorization, found herself with her hands tied.

After again obtaining her military freedom, Germany organized the mounted units from the hundred-thousand-man army into cavalry regiments, as a foundation for the reconnaissance battalions that were to be created in case of mobilization, and these, combined together into a division, constituted a sort of army cavalry for employment on the eastern front. Nowhere did there exist any doubt that the days of mass attacks were past, that from now on it was the mission of the cavalry to get its weapons in a hurry over every sort of terrain and into action at the decisive spot.

And so, in the present war, cavalry has in truth come up to the expectations that were entertained with regard to it in those places where—as in the nearly trackless expanses of the eastern theater of operations—marshy and brush-covered terrain, sandy steppes, and snow-covered areas render the advance difficult for its sister arms, where rivers and streams constitute serious obstacles to these other arms yet can be crossed without bridges or ferries by the cavalry, by swimming or fording. It was especially to the German cavalry division that we were indebted for the quick crossing of the Narev, the occupation of Holland, and the blockading of the fortified area of Paris on the west at the beginning of the war. The reconnaissance battalions and the cavalry platoons of the infantry regiments, by close-range and combat reconnaissance, were able to a great degree to complete the picture that had been obtained of the enemy by means of air and motorized reconnaissance. Also a few minor attacks were successfully carried out by them all alone. Rumanian and Italian cavalry units also have done outstanding work in the eastern theater of operations. Italian cavalry even carried out a major attack on Soviet infantry.

The Soviets have made very heavy use of their cavalry, and made a great deal over it. The Swedish review, *Svensk-Ryttartidning*, published recently, in an interview with a Soviet cavalry officer, noteworthy details regarding its organization and methods of fighting. We read that "the cavalry of the

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Soviet Union has at its disposal, in addition to the usual light and heavy weapons, also its own tanks, planes, armored trains, artillery, and engineers. Its reserves are trained, even in premilitary courses for youths, in the peculiarities of the branch of service in which they are to be employed in the future. They come mostly from the rural districts; hence have been used to horses from their childhood up. The horses of the Soviet cavalry may at times not possess a pleasing appearance, but they are inured to the inclemencies of the weather, possess great endurance, and are capable in every respect of fulfilling the task assigned to them. They are trained to remain standing where the riders place them. As soon as the rider has gone into position on the gallop and has separated himself from the horse by a leap over its head, his horse lies down in the protected position *behind* him (no longer, as formerly in the case of the Cossacks, in front of him as a sand bag and carbine rest). If the horses are to seek the shelter of cover farther to the rear, they are assembled loose back of the front and driven to the rear by a soldier who acts as a herdsman in the manner they have been accustomed to all their lives. The Soviet Field Regulations state with regard to the missions of the cavalry: 'The strategic cavalry is able to carry on the fight independently. It is thoroughly schooled to cooperate with infantry, tank, and air formations. Attack in any situation is the guiding principle of their action. On the flanks and in the rear of the enemy is where they should preferably be employed.' "

The Swedish review forgets that the Soviets have been able to employ their cavalry successfully only where terrain and weather were particularly favorable—where the cavalry plunged into areas in which the German points of resistance were widely separated. In those cases where they charged powerful formations, especially armored formations, they came out the losers.

The combat strength of the cavalry at the disposal of the armies of Greater Germany, with which Cossack units have associated themselves, has been increased during the course of the present war. Their equipment with machine guns is about like that of the infantry regiment. In the National-Socialist Cavalry Corps, youths who are familiar with horses are being trained, and with the winning of the diploma the way is opened for them to enlist as volunteers in the cavalry. Future officers are trained at the Cavalry School. In the breeding of horses, efforts are being increased, on the basis of the lessons learned on the eastern front, to toughen the young animals.

The Japanese Soldier

From an article by Brigadier General H. S. Sewell in *Britain* (British Information Services) April 1944.

AUSTRALIAN jungle fighters in New Guinea have found that the Japanese fight tenaciously at long and medium range, but that at close quarters, and in hand-to-hand fighting, their morale evaporates. Though they are quick and expert in handling their weapons, Japanese marksmanship is poor. They are armed with a 6.5-millimeter rifle, a cheaply made but fairly effective weapon. It is lighter, and fires a smaller bullet, than either the American Springfield or the British Lee-Enfield rifle. The standard Japanese light machine gun, the same caliber as the rifle, is of the Bren type, though rather lighter than the Bren gun now in use in the British army. It can be fired from the hip or from a bipod, and is fitted with a bayonet for close fighting. The heavy machine gun, 7.7-millimeter, is constructed on the Hotchkiss model. The Australians call it "the woodpecker" because of its slow rate of fire. It is compactly made and easy to move, but is in no way as good a weapon as the Browning or Vickers.

The Japanese hand grenade is different from the Mills and not so simple to operate. The Japanese are addicted to the use of gre-

nades, particularly when they are making an attack, and they are equipped with grenade dischargers which they use for close infantry support. Such covering fire is not very accurate, but they like the noise, which they consider distracting and alarming for their opponents. Officers and NCO's are armed with 8-millimeter pistols which look like the German Luger but have a mechanism quite different from that of any other pistol in the world.

In addition to his weapons, the Japanese soldier carries light entrenching tools and a saw or a billhook. His arms and equipment are on the whole good and well adapted for campaigning in southeast Asia. He is suitably, though not attractively, clothed in jacket, breeches, and puttees of light, strong olive-green cotton and a peaked cap with a five-pointed yellow star. He has an ugly dome-shaped steel helmet, and sometimes he wears a sun helmet made of straw and covered with cloth. Inside the steel helmet is a Rising Sun flag presented to the soldier by his friends before leaving home and inscribed with their names. His boots are of brown or black leather, but in the tropics he usually wears rubber-soled canvas boots with a division between the big toes and the others.

He wears a belly-band, or *Senninbari*, a belt of a thousand stitches, supposed to confer invulnerability, each stitch having been sewn by a different person while praying for the well-being of the wearer. His pack is made of canvas, or of hide with the hair still on it, similar to the packs used by the German Army during the last war. His small water bottle is made of aluminum, painted brown and slung on a canvas strap. Simple toilet articles are carried in a wicker container. Razors are not as a rule included. The troops in the forward area seldom shave, but they keep their heads closely cropped. Most soldiers carry a Shinto or Buddhist charm. The Shinto charm, often of wood, has the name of a shrine burned into it, and is wrapped up in gilt-bordered red or white paper. The Buddhist charm may be a small, flat image.

The Japanese army is well equipped with medical supplies. In addition to a first field dressing, quinine and vitamin tablets, foot powder, anti-mosquito lotion, tablets for sterilizing water, and a simple iodine applicator are all included in the soldier's personal equipment. He usually carries his pay-book, sometimes more than six months in arrears, army postcards, and family photographs. Picture postcards of places he has visited in southeast Asia and of well-known geisha and film stars are all popular. He may have a variety of paper money, Malayan dollars, Netherlands East Indies guilders, Australian pounds and ten-shilling notes, all printed by the Japanese army. A copy of the Imperial Rescript of 1882, which lays down the military code of honor known as *Bushido*, is usually carried, bound in cloth or leather, and a private seal in a small case containing vermilion wax.

Rice is the basic diet of the Japanese soldier, and he cooks it himself in the field. For transportation, it is packed with a triple cover; three sacks, one inside the other. The first is of rubber, the second of rubberized fabric, and the outside one of canvas. Sacks, so packed for sea transport, have been washed ashore from sunken barges, and even after a long time in salt water the rice has been perfectly dry. The soldier has his own chopsticks, which he carries in a small bamboo case. Hard biscuit forms a part of the field ration; also bean paste, soya bean sauce, pickled radish, and a little green tea. The allowance of *saki*, Japanese rice-wine, is liberal, but most of it is usually consumed by the officers and NCO's.

Judged by his home standards, the Japanese soldier is well provided for in the Army. He has been living under active service conditions for the last twelve years, or since he reached the age of seventeen, and he has become a seasoned campaigner. The fact that he wears the uniform of his Emperor raises him in his own estimation and in that of his countrymen, and by the ethics of his spiritual belief he considers himself endowed with superhuman power.

Though poverty-stricken and lacking in mental development, the Japanese soldier is a very formidable adversary.

The Anzio-Nettuno Bridgehead—A German Account

Translated at the Command and General Staff School from a German article by Dr. Fritz Meske, War Reporter, in *Die Wehrmacht* 8 March 1944.

THE GERMAN attack, whose armored point has now reached the east-west highway inside the bridgehead, is being met by the enemy with furious counterattacks. The situation at the focal point of the action south of Aprilia is almost without parallel in this war in point of intensity of fighting. The two adversaries are hurling themselves at one another with unheard-of violence to the accompaniment of raging artillery fire. Both sides are so badly hedged in in narrow sectors of the front that it is impossible, in the heat of the fighting, to get a clear view of the front line. Attack wedges that have pushed their way ahead of the rest of their forces, flanking thrusts by the enemy, groups of greater or lesser magnitude being encircled by the enemy—that has been the picture of recent days' fighting at Nettuno.

It is not easy, under these circumstances, for the command to maintain control of the fighting at all times. Although this fighting on level terrain surrounded by mountains offers unusual advantages to the higher command, the whole of the battlefield can hardly be seen from one location. The commander of the German army directs the operations from the vantage point of an advanced command post in the classical manner seldom seen in the present war, namely, by means of personal observation of the course of the fighting from a hill. When the terrain is not hidden by the smoke from shells and bombs, the commander, by means of an observer's telescope, is able to see the whole of the bridgehead including the enemy landing vessels. Not a flash of a gun or explosion of a shell from either side escapes him. However, it is astonishing that the battle movements of the troops themselves, especially the infantry, can scarcely be seen, even in this open terrain of the Pontine marshes. Very frequently, therefore, the commander climbs into his armored car and goes to the place itself, where he plans to act by means of direct command. In the meantime, the chief of the general staff assumes control of the course of events at the map table and the telephones of the advanced command post.

The closer the fighting gets to the immediate vicinity of the point of the landing, the more intense the concentration of the enemy artillery fire has become. An artillery battle is being waged here with an unheard-of expenditure of ammunition, and with a massing of equipment that exceeds any heretofore experienced. Even in comparison with the penetrations of the front in the great battles in the east, this battle represents a great increase. As soon as war vessels of the larger types arrive off Nettuno or Anzio, they immediately make their presence known by the fire of their heavy naval guns, which reaches far into the areas behind the Alban Mountains. The enemy aviation also is possessed of an unearthly activity. So is the German antiaircraft defense, as well as the German offensive power in the air, which is becoming constantly more apparent.

In the consciousness that the entire prestige of the idea of an invasion as well as the fate of a large army supplied with the finest of fighting equipment is at stake in this battle, the enemy is fighting at Nettuno with unprecedented stubbornness without regard for the men and matériel employed. In our successful efforts to reduce the area of the bridgehead, we are opposed to an increased degree by the enemy's desperate efforts to achieve operative freedom on his own part. He had desired to march northward from Nettuno and envelop the German army in the south. Now he himself has been enveloped in the most painful manner, and has been violently shaken in the choking grip of the encircling German ring. But he has continued the fight with the greatest of determination.

The battle south of Rome has grown to a gigantic clash between material and animate forces of every kind, for each side has been aware that a great deal is at stake here.

Night Raid on the Village of Khotomlya

Translated at the Command and General Staff School from a Russian article by Captain Sokolsky, Soviet Army in *Voyennyi Vestnik* (Military Journal) June 1943.

OUR RIFLE division held a frontage of almost forty kilometers. The forward edge ran along the river Severnyi Donets, but the enemy had managed to retain a few bridgeheads on our bank.

We were opposed by the German 294th Infantry Division which consisted of three full-strength infantry and one artillery regiments.

Our division received the following mission: to activate the defense, to wear out the enemy, and to destroy his manpower and matériel. Considering the frontage, the lack of manpower and matériel, and the fairly large forces of the enemy, this mission was quite difficult.

The commander of the division organized a small but mobile detachment equipped with automatic weapons. This "destroyer battalion," as it was called, consisted of specially selected officers and men, mostly volunteers. As a result of several successful engagements in which this battalion had participated, the army command became interested in it and began using it for various combat missions, chiefly of a reconnaissance character. A second "destroyer battalion" was organized in the division. The battalions, by their bold and sudden attacks (mostly at night) on separate strongpoints, headquarters, depots, and other objectives of the enemy, played an important part in the accomplishment of the mission of our division. One of the episodes in the battle activities of these destroyer battalions is described below:

The Germans were getting ready for a holiday, and it was expected that their vigilance would be somewhat weakened. The division commander, therefore, ordered the two battalions to raid the village of Khotomlya, one of the largest enemy strongpoints on our left bank of the river, on the eve of the holiday. The mission of the battalions was to destroy the village garrison, to capture matériel and prisoners, and then to withdraw without engaging in any protracted battles because of the weakness of the battalions—about 300 officers and men.

Three days were allowed for the preparation of the raid. This time was used for a careful reconnaissance. Reconnaissance in force carried out by our small reconnaissance detachments established the fact that the Germans had no outposts around the village (they were obviously afraid that our reconnaissance patrols would "remove" them). The location of ring positions in the outskirts were determined, and an estimate of the enemy forces was made. Comparing these figures with the information obtained from the prisoners taken in our sector, our

staff came to the conclusion that Khotomlya was defended by four infantry companies, one machine-gun company, a battery of 37-mm antitank guns, and a battery of 81-mm mortars of the 515th Infantry Regiment.

The village of Khotomlya occupied an area three kilometers along the river and two kilometers wide. There was a grove on our side which was about 800 meters from the houses; a flat field extended between the grove and the village.

It was decided:

To attack at night;

To attack frontally for the purpose of simultaneous destruction of all firing positions in the outskirts;

To refrain from artillery preparation so as to insure complete suddenness of attack;

To get across the flat field by crawling (preliminary training was to be carried out in preparation for this);

To employ a combat formation consisting of company chains; not to echelon the battalions; to put all the force in the first effort in order to attain complete success at once;

To have a small reserve;

To launch the assault by shouting "hurrah" in order to reveal to the commander to what depth our units had penetrated.

During the preparation for the attack and reconnaissance, the commanders of all units had become familiar with the terrain. Each one of them was assigned the exact line of departure for the attack, the objective, and the place of assembly in the village. The latter was extremely important because during night battles not only individuals and squads but even whole platoons often get lost. In designating the direction of the attack the name of the nearest street was also indicated. Churches, windmills, and separate buildings were used as reference points. For the reporting of targets the village was divided into numbered sectors.

All men were supplied with arm bands. Each one knew the password.

At 2200 both battalions, combined in one group under one commander, left the line of departure and moved in the direction of the village. The advance guard paved the way, and a specially created squad for the evacuation of booty followed the battalions.

Communication with the division staff and the supporting artillery was accomplished by radio; communication with the companies was by messengers and rockets.

At 0100 the battalions had reached the edge of the grove near the village. The enemy illuminated its forward edge by rockets and fired his machine guns once in a while, figuring that if our fighters attempted to approach the village they would consider themselves detected and would fire back. Knowing these not-too-clever tricks, our men paid no attention to this firing. The companies began crawling. An hour passed. According to the plan, the battalion had to reach the line of departure for the assault by this time, but the commander decided to wait another half hour. That half hour also passed. Suddenly a German sentinel detected a group of fighters who had crawled up too close to him and sent up a warning rocket. Quite accidentally the rocket was red, and inasmuch as a red rocket was our signal for assault, our men rushed into the village.

The blow was so sudden that the Germans could not organize any serious resistance. They jumped out of the houses undressed and presented a perfect target for our tommy gunners. Our men threw grenades into the houses, broke into the buildings, and destroyed the enemy with bayonets and fire.

The Germans in the rear of the village ran across the river and opened from there a disorganized mortar fire on the southern outskirts of the village. German officers who stayed in the village attempted to direct this fire by rockets, but our men also released German rockets and confused the enemy mortarmen. The enemy fled.

The mission was accomplished and the commander signaled to withdraw. Our units captured four 37-mm guns, ten machine guns, six mortars of various calibers, great quantities of gas masks, rifles, and overcoats, and three prisoners. Seven hundred Germans ran from three hundred Soviet fighters. The

enemy casualties were over three hundred killed and wounded. Our losses were forty men, mostly wounded.

After the attackers had left the village, at first mortar and then artillery fire was heard. Then the enemy, having gathered his forces, attacked the village, but his blow struck an empty place.

This example of night attack is interesting because its purpose was not reconnaissance but diversion. Such "harassing" operations are characteristic of active defense on an extended front.

The experiment in this mission of using specially selected men was successful, because it enabled the commanders to prepare and thoroughly train the men for their assignment.

Night operations call for simplicity in maneuver and small depth of combat formations. Such was the case in the above example and this, no doubt, contributed to the success of the engagement. However, there were faults in the organization of the attack. Had the German guard not signalled with a red rocket, which happened to be our signal for attack, and had that signal not been given just when the companies were ready for the jump, or if the sentinel had noticed the attackers sooner and succeeded in giving the alarm, the battle might have ended differently. It was a happy coincidence that was really responsible for our success.

To assure success in such an action as this, communication between the commander and his companies should be better organized, all signals should be duplicated, and the time for reaching the line of departure by the companies determined more accurately.

Aviation in Surmounting Intermediate Lines

Translated at the Command and General Staff School from a Russian article by Major V. Zemlyanoy, Soviet Army, in *Krasnaya Zvezda* 15 October 1943.

ON SEPARATE sectors of the front it is not seldom that our advancing troops have to carry on battle along the intermediate defensive lines of the enemy. The retreating Germans try to make use of broken terrain for their own interests. Utilizing such terrain, they often go over to the counterattack, massing artillery and tanks for this purpose. In surmounting intermediate lines of German defense and in warding off enemy counterattacks our aviation participates actively.

The main peculiarity of the air support in such a situation is as follows: The bombers and assault planes must operate on point targets, i.e., on separate firing positions and tanks. Here it is essential to control aerial units of planes flexibly, so that they may at any time and at any place affect the outcome of the battle engaged in by the ground forces. Control of combat flights from the observation posts of the ground forces is compulsory. Besides, the battle along intermediate lines is unthinkable without a widely organized aerial reconnaissance of the battlefield. The assault planes and the bombers must carefully follow all the changes on the field of battle and anticipate the attempts of the enemy.

An instructive example of the use of assault planes in battle on intermediate lines is the combat work of the units commanded by Comrade Ryazanov. Perfecting the methods of controlling assault planes, Comrade Ryazanov places his command post with the observation post of the commander of the force of all arms. In this way, he always finds himself in the vicinity of the main effort and personally communicates with the infantry, artillery, and tank commanders.

Radio communication serves here as the basic means of control of the assault planes. The commander, having placed himself in the immediate proximity of the battlefield, has at his disposal powerful radio stations by means of which he can constantly communicate with his staff and with the planes in the air. As a rule, before the approach to the front lines,

the leader of the group of assault planes communicates with the observation post, gives his name, and repeats the combat task, and only after he has received permission does he go after the target. A group of assault planes has no right to carry out the mission without having previously contacted its commander by radio.

At times, aviation commanders organize the control of the units operating over the battlefield through their representatives who are in the combat formations of mobile units. Occasionally, several such representatives are assigned to one or another sector. Each one of these representatives is a delegate of his commander only, but at times some try to command all the planes that have arrived on the battlefield. This might cause disorganization. In the unit discussed here, a firm procedure is established; aviation representatives at the advanced posts for guiding the aircraft may command the planes only in individual cases by special permission of the superior commander. Their basic problem is to inform their commander about the ground and air situation. Thus the control of planes over the field of battle is rigidly centralized.

The convenience of such methods of control of assault planes over the battlefield is shown in the recent engagements along a number of intermediate enemy defensive lines. One of these lines passed along a water obstacle in an irregular terrain. The Germans figured on holding this line and were able to set up a defense there. The first frontal blow of the attackers did not break the enemy's resistance. Then our command decided to break the flanks of the defense and to put the enemy under threat of being gripped in pincers.

Evaluating the situation, the commander of the assault planes suggested to the commander of the force of all arms a plan of aerial preparation and support for the attack. This plan consisted of uninterrupted action on the enemy from the air. The assault planes were to attack the firing positions of the German artillery and mortars.

According to the plan, a procedure was established whereby a group of assault planes was constantly over the field. Following such an aerial bombardment the German fire was silenced and our infantry with the support of aviation and artillery took possession of one part of a center of resistance—a populated place. But in the region of the neighboring height there were still Germans. The Ilyushin-2 planes immediately transferred their blows to that height.

In the meantime the enemy threw his tank reserve into the counterattack, directing it against the lost populated place. Then the aviation commander immediately shifted the groups of assault planes which were passing. The pilots distinctly saw the enemy tanks and with a violent attack they at once destroyed up to ten German vehicles. The remaining tanks, which did not contact our combat formations, turned back. Parrying in a similar manner the German counterattacks, and crushing each new target that appeared, the assault planes assured the success of the attack.

In spite of so precise a control of assault planes it was not always possible to foresee the enemy's designs and to give warning of his operations. There were cases when the air commander saw the counterattack only after it had begun, and took part in its repulse when the battle developed. This means that it is necessary to reconnoiter over the field of battle more carefully. Reconnaissance should be conducted not only by the assault planes, but also by specially selected planes for the commander of the force of all arms as well. Such a reconnaissance, incidentally, prevents the misunderstanding which is liable to arise between the air and ground commanders. The latter do not always consider that aviation can inflict a blow on call only after a certain length of time.

In mobile forms of battle which are characteristic of combat on intermediate defense lines, the attacking ground troops must have recognition signals. Otherwise there is a possibility of losses from our own planes. If there is no safe system of recognition, the pilots will try to carry out the attacks only in the depth of hostile defense, which will considerably reduce the effectiveness of air support.

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The Role of Infantry

Digested at the Command and General Staff School from an article by Major General T. N. F. Wilson, DSO, MC, in *The Journal of the Royal United Service Institution* (Great Britain) February 1944.

BEFORE and also at the beginning of this war doubts were sometimes cast on the claim that the infantry were the predominant arm on the battlefield. Even during the war an experimental reorganization took place reducing the number of infantry brigades in a division by the replacement of one with an Army Tank Brigade, but, again, as a result of battle experience it was proved that more, not less, infantry were required to win the battle. As in the past, so in the present, the infantry have proved themselves to be the predominant arm on the battlefield.

The role of the infantry can be stated very shortly. It is to close with and destroy the enemy. Artillery cannot shell a determined enemy out of a position, nor can they alone stop an enemy attack. Armor cannot destroy in detail nor hold ground, and its action is limited by the ground and the antidotes to armor such as the antitank gun and mines. Infantry is the only arm which in the offensive can operate and get at the enemy anywhere and in the defensive can definitely stop the enemy by means of its own fire power, that is, small arms. The ultimate issue, therefore, on the battlefield must depend on the infantry and, consequently, the outcome of any war. I say this with all due respect to the other arms, whose support is directed towards assisting the infantry to achieve their object, and without which the infantry would suffer unacceptable casualties. The close coordination between all arms and the common effort is designed to beat the enemy on the battlefield, but success must be consummated by the infantry.

In order that the infantry can carry out their role and close with and destroy the enemy, movement is obviously necessary, and the enemy will do everything possible by fire and other means to prevent such movement. Our own movement, therefore, can only be made possible either under cover of the ground or under cover of fire. Obviously, the enemy selects positions which deny, as far as possible, movement under cover of the ground. Therefore the production of the necessary volume of fire to make our own movement possible is of paramount importance. This problem of fire and movement has always formed the basis of infantry tactics, and without these two essentials the infantry cannot perform their task.

I suggest that in the modern battle there are three phases of movement, each of which requires a particular type of fire plan, and the infantry organization is designed to this end. There is the close approach, the assault, and the close quarter fighting. All our modern infantry training is now directed towards close coordination of fire and movement in the different phases of the infantry battle, so that at no time can the task of the infantry of moving to close quarters be interfered with by the fire of the enemy.

In all these phases of movement there is one guiding infantry principle, which is to obtain superiority of fire where tactical success is being sought. In order to do this all the available infantry weapons, in addition to those of the supporting arms, must be brought to bear upon the enemy, not only in the initial stages of the advance, but also up to the last possible moment so that the infantry can literally be shot into close quarters. The high-trajectory weapons with their danger zone cannot cover the last part of the infantry movement, but, provided the firer of a flat-trajectory weapon has positioned himself so that he can watch the progress of the infantry advance, he can continue to shoot just in front of them up till the last moment of impact. This intimate close support by flat-trajectory weapons entails that the light machine guns should be well forward in the battle so that they can shoot the assault into the objective from close ranges up to the last moment. Provided the power of movement is maintained, these flat-trajectory weapons can

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be sited to carry out their tasks, probably from slightly on a flank, or in the case of heavier weapons by overhead fire.

Supporting arms, artillery and tanks, provide a major contribution to preserving infantry mobility, but the latter must at all times be able to fight their war forward and to close with the enemy with the support of their own weapons. It is to this end that the modern organization and fire power of the infantry is designed. In this organization the balance must be held between fire power, assault power, and maneuverability.

The tactical flexibility of the battalion must be preserved, while at the same time it has been found that additional fire power is required for the immediate close support of the infantry during the infantry fighting. This additional support must be immediately available.

In this war the movement of infantry has been further assisted, where required, by the creation of artificial fog in the development of the use and tactical application of smoke. The infantry can now create their own local fog by the employment of smoke from their mortars, while if this is required on a larger scale it can be provided by the artillery. On the other hand modern science has afforded additional means of hampering the movement of infantry, in the shape of antipersonnel mines. In many instances this method has largely replaced or been combined with the use of wire, as we knew it in the last war.

Our basic tactics today are . . . the production of the greatest possible superiority of fire where tactical success is being sought, thus enabling the infantry to maneuver close to the enemy.

In this war for various reasons the fighting has become much more fluid; for instance the threat of armor has imposed an area defense in depth, compared to the linear defense in the last war. There are, therefore, many more opportunities for maneuver and infiltration. This has consequently provided the opportunity for the flat-trajectory weapons of the forward infantry to be so positioned that they can support their movement, in addition to the fire of the high-trajectory weapons. The infantry are once more able to apply fire power to cover their own movement.

I should like to refer to certain more particular aspects of infantry fighting which have emphasized the predominance of infantry on all kinds and types of battlefield. These aspects are combined operations, airborne forces, and fighting in the Far East. These have increased the complexity of the infantry organization, weapons, equipment, and tactics and consequently the high degree of skill required of the infantry soldier.

The infantryman has generally marched into battle, or he may be carried some of the way in mechanical transport; but sea power has always provided a means for launching him by sea direct into battle, and in this war air power has made it possible to do the same by air. Both these methods of operation demand a modified infantry technique to that on land, and these, in turn, require the infantryman to have the necessary knowledge of what is required of him in such different conditions. The onus of the fighting must obviously in each case fall mainly on the infantry. The infantry must carry out the assault landing from the sea and secure a bridgehead, while, similarly, the major component of airborne forces will be infantry in order to seize the objectives on landing from the air. Both these operations require special knowledge and special training, and in certain instances special organization, weapons, and equipment. We have already carried out combined operations on a large scale more than once in this war. As penetration or envelopment become more difficult, the air provides the only open flank. Our infantrymen may, therefore, in the future have to become as well trained in operating from the air as they are from the sea or on the ground.

Again, under the conditions of jungle warfare the fighting must obviously devolve almost entirely on the infantry arm, and it becomes more than ever an infantryman's battle with specialized technique both as regards tactics, organization, weapons, and equipment.

In view of what I have already mentioned, it is obvious that training the infantryman has become more difficult, particularly in the short time available during a war. This has been complicated, too, by the fact that while in the last war the troops could be gradually accustomed to the noises and stress of battle in a quiet part of the line, in this war they may pass from one hundred percent total peace to one hundred percent total war almost instantaneously. Training methods, however, have made progress to keep pace with tactics. These must of course be varied to meet each particular situation. In order to accustom troops to the noises of battle, great attention is now paid to what has come to be known as battle inoculation. As far as safety permits, the noises of battle are simulated, and all troops are shot over during their training.

Infantry front line fighting is the most highly skilled of any type of combat. It demands such a high standard of knowledge, initiative, and leadership, that reactions during the close-quarter fighting become almost automatic. This is possibly even truer today than in the past, because in order to enable the infantry to achieve their object, weapons and equipment have multiplied and become more complex and therefore tactics have become more complicated.

The essential basic qualities of the infantryman are still the same as in the past. Marksmanship and skill with his weapons are as important as ever, but there are now many more weapons with which he has to be proficient. The tempo of war has increased, and not only have commanders got to think and act more quickly, but the troops must also move more rapidly. A high standard of field craft, endurance, and toughness is therefore essential. The infantryman must be able to conceal himself and his positions at all times and must, therefore, possess the stalker's skill and the animal's cunning in camouflage, particularly as he is now watched not only from the ground, but also from the air. It seems an anomaly that in this mechanized age anyone should require the same ability to march as in the past but, if anything, the infantryman's endurance must be greater than before. We expect him to be able to march thirty miles a day and fight at the end of it and to cover ten miles in two hours. Not only now must the infantryman be a master of his own trade, but a "Jack of all trades." He is his own gunner, as artillery pieces are now included in the infantry organization; he is his own sapper, as he must be able to lay and remove mines and use explosives. He has already too in this war had to apply his complex trade under many diverse conditions—in the swamps of the Southwest Pacific; in the jungle of Burma; in the African desert; in the hills of Tunisia; in the Sicilian towns and the mountains of Italy. In fact, the modern infantryman must be a man of great versatility and many talents.

It is obvious that with the high standard required of the infantryman a correspondingly high standard of leadership is necessary and, with the increased pace of war, the means for the leader to control the machine. The latter is provided by wireless and, therefore, a number of infantrymen must have a considerable knowledge of this subject.

As a result of this brief survey of the conditions under which our battles have been and may be fought, it is clear that the infantry must play the predominant part in achieving victory on the battlefield to the same if not to an even greater extent in modern war than in the past. Although the basic qualities of the good infantryman remain the same, he must be even more versatile than formerly. Not only, therefore, must we provide sufficient infantry to win our battles, but they themselves must achieve a very high standard to carry out their role.

Assault Groups

Translated at the Command and General Staff School from a Russian article by Major D. Zaitzev, Soviet Army, in *Krasnaya Zvezda* 6 January 1944.

THE PRINCIPLES of the technique and organization of assault have always depended upon the character of the defense. This is illustrated by the variety of methods now used in the operations against timber-and-earth emplacements and permanent pillboxes. These defensive structures have made the attacker develop special forms of assault carried out by the assault group.

The following are the most typical cases of employment of assault groups: (1) operations against the forward edge of enemy defenses containing permanent emplacements such as pillboxes, etc.; (2) operations against separate fire emplacements and whole strongpoints impeding the advance of our infantry units; (3) operations against fire emplacements and strongpoints by-passed by our advancing troops; (4) operations against enemy fire emplacements suddenly coming to life on the flanks of our advancing units.

It should be noted that the assault groups play an important role in the battles for populated places where the enemy, making use of separate buildings and entire blocks, organizes a formidable defense. It is obvious that in all cases the organization of the assault groups—their composition and equipment—is taken care of beforehand. Special attention is paid to their thorough training, for these groups are called upon to carry out very complicated and difficult tasks.

The tactics of assault groups are basically the same as those of small units. However, there are some important differences. Assault groups attacking or blockading firing emplacements use artillery more often and on an incomparably larger scale. The same may be said of the other fire means. In addition to this, the assault groups use engineer equipment very extensively. It should also be taken into account that assault groups are better adapted for repulsing counterattacks undertaken by the enemy from without or by the forces of the strongpoint. The assault group, properly organized and supplied, can repulse tank and infantry counterattacks by means of mortar and antitank fires and by incendiary equipment.

The assault groups have no special tables of organization. They are formed as needed from infantry, engineer, and artillery units, as well as from submachine-gun groups. Here are examples of the composition of two assault groups which participated in the engagements near Melitopol. One group consisted of a squad of submachine gunners, two squads of antitank riflemen, one squad of sappers, and one 37-mm gun. The other group was made up of a squad of sappers, two rifle squads, and two squads of antitank riflemen. It also had one 45-mm gun, three heavy machine guns, and four light machine guns. Both groups, in addition to the above weapons, had submachine guns, hand grenades (including antitank), and assault knives. The sappers carried charges of explosives and blasting caps. The sapper carrying the charges carried the caps as well.

The assault groups, in addition to submachine guns, need rifles with bayonets, as they often engage in hand-to-hand battles. In some cases, paired snipers for firing at the embrasures are included in the assault groups.

The assault group is divided into subgroups. If an objective protected by obstacles is attacked, a special subgroup to take care of the obstacles is created. It makes passages through minefields and wire obstacles. This subgroup consists of two or three sappers, sometimes a squad of sappers, equipped with mine detectors, rods, shears for cutting wire, and, in some cases, explosives.

While operating against a large building, an assault group encountered a stone fence which was covered by a strong machine-gun fire. It was impossible to climb over the fence. Then a special subgroup was formed composed of one junior officer and two sappers. They had two explosive charges, each

weighing twenty-two kilograms. The work of these sappers was covered by the artillery which was included in the assault group, and also by submachine guns. The sappers crawled up to the fence, set the charges, and blew it up. Two breaches, each six meters wide, were formed. These passages secured the success of the entire assault group.

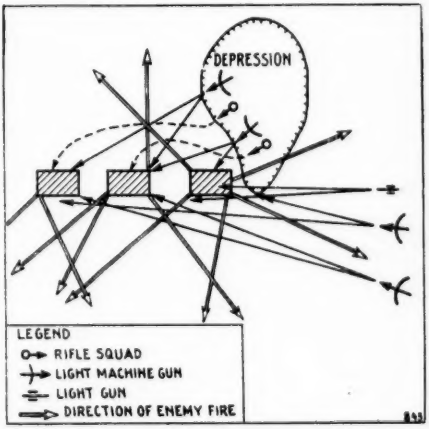
Such subgroups are often used for engineer reconnaissance for the assault group. They have to find out where the obstacles are located and start at once the construction of passages through them.

Assault groups also include demolition subgroups. Those subgroups are usually made up of sappers. Under cover of fire, they crawl up to the emplacement and block its embrasures with stones, bricks, bags of earth, etc. They also blow up the objective, throw explosive charges and antitank grenades into the emplacements, or blind the garrison by the use of incendiary bottles.

And here is another engagement typical for assault groups. An assault group attacked three houses fortified by the Germans (see sketch). The group consisted of two rifle squads and a squad of sappers. It was armed with one light artillery gun and two light machine guns. The operation was carried out at night. First of all, a fire emplacement in the first house had to be destroyed, permitting the infantrymen and the sappers to occupy a depression from which the other two houses could be taken care of. The first problem was solved by the artillery gun. It destroyed the fire nest in the nearest house, and the men moved into the depression. Then, covered by available fire means, they crawled up to the other houses and began to throw into the windows charges of explosives, each weighing four kilograms. As a result, all the three houses were seized by the assault group.

The following engagement is also typical. It is of special interest because of the circumstances under which it took place. The advance of an infantry unit was checked by a group of enemy tanks. These tanks had been dug into the ground and covered by a roving battery of self-propelled guns of the "Ferdinand" type and by one light gun. The tanks were dug in to the height of the tracks. Apparently they were preparing for a counterattack. It should be added that the tanks were also supported by submachine gunners and by fire from a small hill situated to the right of them.

Inasmuch as the basis of enemy defense was the tanks, it was necessary to knock them out first. For this purpose, assault groups were formed. The sappers of the group crawled to the tanks under cover of fire of all available fire means. Each sapper had a bundle of hand grenades and one antitank grenade. Having crawled up to the tanks, two of the sappers blew off two tank turrets as well as the barrels of their guns. The crew of the third tank ceased firing and attempted to escape, but was destroyed by



the sappers of the demolition subsquad. Having lost their protection, the self-propelled battery left the position which it had held up to this time. As a result, our infantry unit was now able to continue its advance.

Finally, let us consider a case where the assault group had to repulse counterattacks. It was necessary to assault a three-story building which the Germans used for defense. The garrison of the building consisted of a platoon of submachine gunners, five snipers,

and two light guns. The terrain in front of the building was open and well covered by fire. Our assault group consisted of a rifle platoon and two squads of sappers. It was armed with two light machine guns, three antitank rifles, and two artillery guns. The action developed in the following manner:

Both guns and the three antitank rifles carried out a short fire attack. Then, under the cover of fire delivered simultaneously from three sides by the infantry platoon and the machine guns, the demolition subgroup went into action. The sappers crawled up to the building and threw hand and antitank grenades into the windows and embrasures. As a result, one enemy gun in the first story was destroyed.

Following this the sappers broke into the building and, with the help of the supporting subgroup, destroyed a part of the enemy garrison in hand-to-hand combat. The rest of the garrison withdrew.

The commander of the assault group thought that the enemy would attempt to recapture the tactically important building and would counterattack with the aid of tanks. In order to stop the enemy tanks, the commander sent out ahead the obstacle subgroup. This subgroup laid eighty mines on all tank approaches. Enemy tanks appeared a little later. Having encountered the mines, they dispersed and withdrew. On the next day, the enemy undertook several flank counterattacks with superior forces. The assault group was within the enemy semicircle. It continued, however, to defend itself stubbornly. Our infantry units arrived and threw the enemy back, and later defeated him completely.

The arming of the assault group with various fire weapons and the presence in their ranks of a comparatively large number of sappers raises the question of the selection of group commanders. As a rule, infantry officers are assigned as group commanders. Experience shows, however, that it is expedient to use sapper officers as commanders. In a number of cases it is simply imperative. Thus, if combat engineer units are used to form assault groups they should be commanded by sapper officers. The operations of such groups, however, are confined to the main zone of defense.

Thus, the task of the assault group is the operation against strong and well fortified emplacements of various types. In addition to this, they accomplish a number of other missions, such as blowing up emplacements and strongpoints. On the whole, they are intended for the breaching of strongly fortified defense zones. This, of course, is done in cooperation with the infantry and other arms.

General Staff and Command

Translated and digested at the Command and General Staff School from an article by Lieutenant Colonel Gregorio Lopez Muniz of the General Staff, Spanish Army, in *Ejercito* (Spain) May 1943.

THE GENERAL staff has its definite mission, which is clear-cut and concrete and of enormous and fundamental importance to the development of operations. This mission, however, should never leave its proper sphere, much less supplant the command.

The war of 1914-1918 was filled with incidents of this type, some of them of enormous significance. General Douchy, Chief of the General Staff of the 7th French Army, speaks as follows: "The German General Staff did not stay within its proper bounds. It usurped the place of the command, especially in large units which were commanded by princes of the blood who were commanders in a nominal sense only." The following words are from Ludendorff: "The Field Marshal, from Tannenberg until the 18th, was always in accord with my way of thinking and approved all my plans." From these words we

may infer that Hindenburg did nothing but second the decisions of his Chief of the General Staff.

This trespassing, on the part of the general staff, of the sphere of action of the command originates in the highest hierarchy and continues and persists through all echelons, and the general staff officers find themselves obliged to make decisions with regard to aspects of the campaign with which only the commanding general is competent to deal.

The part played by Lieutenant Colonel Hentsch in the first battle of the Marne is well known. According to General von Kuhl, Lieutenant Colonel Hentsch was assigned the mission of ordering, *in case of necessity*, the withdrawal of the whole army. When Hentsch arrived at the headquarters of the 2d Army, General von Bulow gave him an unfavorable report and Lieutenant Colonel Hentsch ordered this army to retreat. He then went to the 1st Army, where the situation was completely different. Optimism reigned in the headquarters of General von Klutz, and his Chief of the General Staff, von Kuhl, in the absence of his general, flatly refused to give the order for retreat and yielded only when Hentsch portrayed to him, in somber colors, the situation in the 2d Army.

Can a more distressing situation than this be found, or one in which the action of the command is more lacking? The most important decision in the entire war, the one that is the heaviest with responsibility, and on which the future of nations may depend, falls to the lot of a simple lieutenant colonel of the general staff. The commander, the only one who can and should decide and who is really responsible, is absent when the most important decision of the beginning of the campaign of 1914 is made. He is hundreds of kilometers away from his troops, ignorant of the real situation because of the uncertainty of the channels of communication, and delegates his authority to an officer of the general staff when he leaves for a period of two days with the fate of his army in his hands. We believe, with von Kuhl, that the one responsible for what happened was not Lieutenant Colonel Hentsch, "but solely he who assigned the mission to him, he who gave him the authority to make decisions in the most critical hours of the campaign."

These prerogatives and powers were subsequently modified, limiting the general staff to the missions that belong to it and thus obtaining the magnificent directive cadres which have given the German Army the most brilliant victories recorded in military annals.

And what is this mission of the general staff?

In Chapter II of our Regulations for the Tactical Employment of Large Units we read: "The chief conceives and decides. In each echelon of command, only the chief can adopt decisions, a prerogative that is attached to the greatest authority."

And further on, in Chapter III, we find this: "The general staff furnishes the commander with the elements he requires for the basis of the conception that he forms and the decisions that he makes. It assists the command, but it itself does not command. The general staff is not an autonomous organ of command. Neither is it an executive organ even though it is true that, after transforming into orders or instructions the decisions of the commander and communicating them to the subordinate commands, it must keep an eye on the execution of these even though it is not qualified to enforce them."

This is, in our opinion, the clear concept of what the command and the general staff should be. The general staff *assists the commander, but it does not command.* As soon as there is a duplicity of persons exercising command, the decisions and maneuvers lack the energy that can be impressed on them only by the chief who is responsible to the nation, the army, and himself.

Because of the pernicious effects produced by the intrusion of the general staff into the sphere of command, some, going to the other extreme, draw the conclusion that there should be an absolute annulment of the personality of the former. Captain Castex of the French Navy says: "The work of the general staff is, in fact, impersonal, and this is just what distinguishes the general staff from the command. An order is not the expression of

the ideas of the general staff but of the will of the commander. These recommendations of impersonality appear a bit exaggerated, however. It might be that those who take this stand have yielded to the intense fear that the general staff officers would become conceited as a result of their daily contact with the chief and finally come to consider themselves the command, thus losing sight of the true situation."

"I believe," Castex continues, "that it is indispensable that the chief have about him at critical moments officers who are not only able to draw up an order and fill out a march table, but who are distinguished counselors. I cannot subscribe to the opinion occasionally expressed that the chief has no need of officers at his side who are conscious of the enormous importance of their charge. On the contrary, every one in the military profession should be aware of the importance of his mission, which is not the mission of one, but of all. Only by paying this price can great results be attained. And this concept assumes the existence of a soul in every one, a capacity for thinking—that is to say, a *personality.*"

This personality within the impersonal organization represented by the general staff has nothing to do with the idea of responsibility which, as far as it has reference to decisions and the conduct of operations, is wholly and absolutely a prerogative of command.

German Tactics of Combating Guerrillas

Digested at the Command and General Staff School from the Soviet *Handbook of the Guerrilla,* 3d edition, 1942.

GUERRILLAS' activities force the Germans to be constantly on the alert. Therefore, in the regions temporarily occupied by them, the German command is compelled to resort to a special guard system and to punitive measures.

The Germans divide the occupied areas into sectors, each of which is assigned to a division. Every division has special reserves for instant action against the guerrillas. Divisional sectors and the methods each division employs in fighting the guerrillas should be studied. Disposition and strength of special reserves should also be known and always kept in mind.

The Germans pay particular attention to the security of their lines of communications, namely, highways and railroads. In frontal regions, each 100-kilometer section of road is guarded by a battalion. This, of course, varies depending upon the size and importance of the road and upon terrain. Every kilometer of road may be guarded by two men detailed from the battalion for constant guard duty. The remainder of the battalion is assigned patrol work and serves as a reserve.

Each company is assigned its own sector. The companies send out field patrols of from ten to twelve men. Battalion and company commanders are usually with the reserve contingents, which are located in the center of their respective sectors.

The field patrols and reserves set up strongpoints surrounded by barbed wire. These are usually located in places with a good field of fire. Reserves are moved by motor, by railroad motor cars, and by special trains.

Posts are established to guard individual objectives. Their strength depends upon the size and importance of the objectives. As a rule, they are doubled at night. Sentinels are stationed not only under bridges, but on trestles as well. Posts with poor fields of fire have more men.

German patrols ride back and forth continuously, often on motorcycles. In daytime, they cover a strip several kilometers wide on both sides of the road. When troops are available, this strip may be as wide as twenty kilometers. All populated places within it are

investigated. At night, however, only the road itself is patrolled.

In order to get a better field of fire and to deprive the guerrillas of concealment, the Germans often burn hamlets located near railroads.

For fighting the guerrillas in a given area, the Germans employ special troops which are garrisoned in populated localities. In most localities the garrisons are either companies or larger units.

To learn the disposition of guerrillas, the Germans usually use spies. Sometimes, the latter are German soldiers dressed in civilian clothes. Then the Germans designate certain places for ambushes and occupy them at night. In the morning, the main forces of punitive troops march up to the line of ambushes. On their way up, they examine populated points, individual back yards, and houses.

Undertaking punitive expeditions, the Germans, as a rule, do not resort to troop reconnaissance and never to reconnaissance in force. In their opinion, reconnaissance will only warn the guerrillas of impending danger. Therefore, while on a punitive march, the Germans send out only advance guards.

The Germans always try to surround guerrilla units and to attack them, preferably late at night or at dawn. If, for some reason, a unit is stationed in a populated point, the Germans will suddenly open fire either with incendiary or signal ammunition, attempting to set fire to straw roofs. As a rule, this is followed by mortar fire. Then comes the concentric attack of German storm detachments. Some troops are always left in reserve. Individual enemy detachments maintain communication with each other by means of signal rockets and telephone. Sometimes the Germans use motorized and cavalry units for attacks on populated places. In such cases, the motorized unit breaks through the populated place, while the cavalry units surround it. The cavalrymen usually make a check of all inhabitants.

Units most commonly used by the Germans in fighting guerrillas are companies and platoons. They are armed with heavy machine guns and grenade rifles. For transportation, they use bicycles, motorcycles, and trucks.

When guerrillas are found on islands with difficult approaches, the Germans use grenade rifles on a large scale. Small detachments take dogs with them.

Operating against our guerrillas the Germans recognize only one kind of battle—the offensive battle. Defensive battles are considered extremely undesirable. If their attack fails, they prefer to quit fighting and withdraw. This means that guerrillas should always energetically force their initiative upon the enemy. If, however, a short attack is not at once successful, they should quickly disengage from the enemy and withdraw, if possible.

The Germans also undertake large expeditions to clear whole districts of guerrilla groups. For such operations the Germans assign at least a battalion to operate within a zone of up to twenty kilometers on each side of a railroad. Such a unit covers about fifteen kilometers a day. To avoid warning the guerrillas, reconnaissance is not conducted. All along the way populated places are examined and individual houses are searched. When time is available, the Fascists make a two or three-day halt in every large village to get information concerning the guerrillas, be it by cruelty, intimidation, or bribery. While the main enemy forces are at rest or halt, mobile detachments return to the villages already examined in order to get the reaction of the guerrillas and of the local population to the measures taken by the Fascists.

Even when the Germans send out punitive expeditions, they consider the combing of large forested areas impossible. The forces required would be very large. Operations in forests are dangerous. The Fascists are afraid of large forest tracts.

To find guerrilla units, the Germans use aviation. Their planes fly over villages at low speed and altitude. They examine them thoroughly, paying attention to traffic on roads, fires, smokes, etc.

Guerrillas should thoroughly conceal their movements, making use of various terrain

features, vegetation, and darkness. Open and smoking bonfires should not be allowed. Special dugouts should be prepared for this purpose. To mislead the Germans, open bonfires should be started some distance away from the location of the unit.

Every guerrilla should know the rules of camouflage against aviation and be skilful in fighting and hitting Fascist aircraft with rifle and machine-gun fire.

The Use of Tanks as Heavy Cavalry in Italy

An article by M. J. Massey in *The Sphere* (Great Britain) 29 January 1944.

WHEN IT comes to dislodging an enemy from hilly country, such as frames practically the whole of our present line in Italy, a number of conventional solutions have to be scrapped. It is usually not possible to group the weight of artillery necessary to bring a really knock-out barrage on the target, and the enemy normally has plenty of "dead ground" in which he can shelter his troops until the moment when he has to produce them to meet attacking infantry.

In really mountainous country the ground confers no favors on either side, and the old axiom that defense is the stronger part of war is never truer. In pre-mechanized days, the advance on Rome would have been looked on essentially as a job for cavalry, with good infantry backing them up. It is interesting to note that for one of the few times on record in this war, the tanks on both sides are now actually playing the scouting, thrusting, and harassing roles they were originally intended for in their role of mechanized cavalry.

We have seen them used as mobile artillery, as stationary strongpoints, and as a kind of armored infantry going in under the cover of heavy artillery barrages, but not often indulging in neat, quick, cut-or-thrust actions such as those it was always held they would fight. But at last, in the actions around Ortona, Tommasso, and most recently at Cassino, the fighting has temporarily taken on a cavalry character. The enemy has very sensibly chosen to use his tanks, not in stolid frontal attacks which give opposing artillery ample time to do their worst, but in enterprising sorties calculated to inflict the greatest inconvenience on us at the least cost to them. Thus, German tanks lurk near bottlenecks in the line of our advance. If they can catch an advance party of our infantry working its way forward without much in the way of support, they will swoop down and exploit the situation. As soon as the element of surprise is lost they will be off to try their luck elsewhere. Some of our forward field engineering companies seem to have been particularly harassed by these roving panzer groups, probably composed of the faster medium-armor types. Parties of our troops endeavoring to prepare bridgeheads for our forces have been singled out for attack, frequently before they have had time to establish their position securely. There is little doubt that the Germans make a practice, when their infantry are forced to leave a position, of sending a fair force of tanks to investigate the chances of making at least a temporary counterattack before we have settled in. In country where the advance is continuously under the protection of heavy artillery such tactics would not pay, but in the labyrinthine folds of the Apennines it has been quite profitable. Two other factors have also helped the Nazis here, our "tank-buster" air squadrons have frequently been grounded on their temporary waterlogged airfields, and our forward troops have often been operating on the far side of swollen rivers and damaged bridges over which it has been difficult to bring our own armor.

The Allied tanks, on the other hand, have found their principal occupation in the heavy street-fighting which has been such a feature of the whole front. The cracking of strongpoints in house cellars, or pillboxes concealed

on the ground floors of innocent villas, is a killing job for the best infantry. The Shermans were instrumental in smashing up the snipers' nests and local strongpoints on the street-by-street occupation of Ortona, they supported the Sangro crossings, and now, in the Cassino push, they are supporting the infantry assaults and joining in close-quarter fighting designed to clean up Nazi positions on either side of the main Rome road.

To the tanks and the infantry falls the job of the moment. In another few miles and another few weeks it may well be the turn of artillery or air again.

Tank Destroyer Unit in Meeting Engagement

Translated at the Command and General Staff School from a Russian article by Lieutenant Colonel P. Kolomeytzev, Soviet Army, in *Krasnaya Zvezda* 20 October 1943.

This article describes an unusual engagement—a tank destroyer regiment versus German tanks and infantry. It all happened after the German tanks wedged into the Russian lines. The Russian infantry joined in later, but that phase of the engagement is not described in the article.—THE EDITOR.

WHEN GERMAN tanks succeeded in wedging into our lines through a gap which had formed between our units, the tank destroyer unit in reserve went to meet the enemy.

In the afternoon the commander received his combat mission, and around 1500 hours the unit started to march in the designated direction. Reconnaissance and march security elements were sent out in advance. After more than two hours, the reconnaissance elements reached the populated places of Myasoyedovo, Sevryukovo, and Yastrebovo (see sketch) from the north, and stumbled upon a group of enemy tanks. The commander of the reconnaissance detachment immediately reported this to the commander of the unit. The latter joined his scouts immediately in order to study the situation personally and make a decision on the spot.

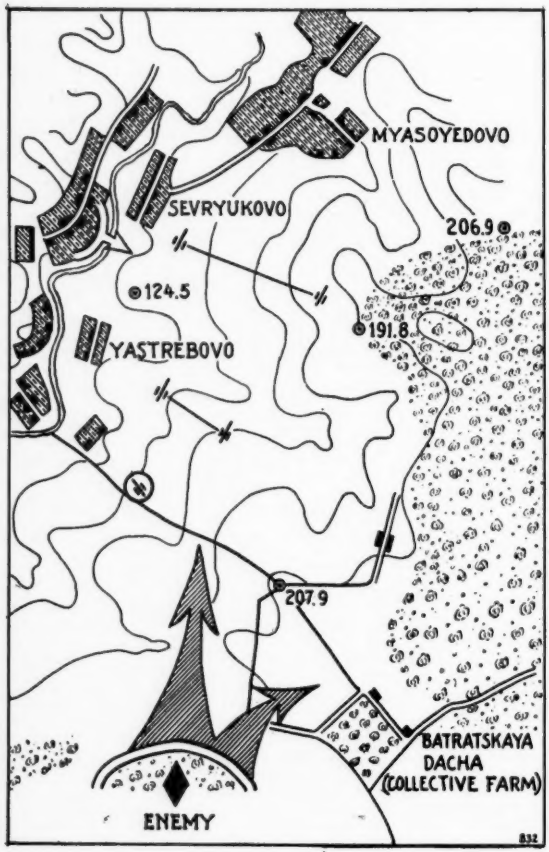
Upon reaching Hill 191.8, the commander caught sight of the following picture. Up to seventy German tanks were descending the slope of a hill and emerging from the grove south-west of Hill 207.9. The tanks were moving straight toward Yastrebovo in a column and at close intervals. The head of the column consisted of nearly twenty heavy T-VI's ("Tiger" tanks). Its tail could not be seen. More and more hostile tanks were appearing on the horizon.

Obviously, this was a large group of hostile tanks which should be engaged in battle immediately, for by making use of his mobility the enemy might avoid it. The Germans had not as yet detected our artillery. They were confidently moving toward the tank destroyer unit. The advance guard of our unit (the battery of First Lieutenant Pochtarev) had reached the village of Yastrebovo by this time, while the main forces were approaching the village of Myasoyedovo.

Without losing a minute, the commander of the unit made the decision. Pochtarev's battery moved out southeast of the village of Yastrebovo and occupied a position near the road in order to hold the enemy and secure the deployment of the main forces. This deployment was planned to take place on the line between Hill 124.5, Sevryukovo, and Hill 191.8.

Pochtarev's battery took the first blow upon itself. The Germans were moving straight toward it in a column, and did not turn sideways even after they had been subjected to an intense shelling. It was a fierce engagement. Having before them tens of hostile tanks, the personnel of the tank destroyer battery did not waver, and carried out their duty to the end. The fight took place at a distance of from 500 to 200 meters and nearer. The battery was firing at a maximum tempo. Shell bursts in front of the hostile tanks were

forming clouds of dust and smoke, and this prevented the Germans from conducting accurate fire. Nevertheless, their fire was very intense, and the battery began to sustain losses. However, it continued to fire and destroyed fifteen heavy enemy tanks of the "Tiger" type.



Having accomplished its mission, Pochtarev's battery withdrew to Yastrebovo. Later it formed the unit commander's reserve in the vicinity of Hill 206.9. During this time, the main forces completed the deployment on the designated line and prepared to meet the hostile tanks. Thus, the first part of the plan of the regimental commander was accomplished; he was able to gain enough time to deploy his batteries.

Later on, events developed in the following manner. One group of enemy tanks, about sixty machines, went toward Batratskaya Dacha. Over fifty German tanks deployed and moved to the line Hill 191.8—Sevryukovo. The remaining T-VI tanks protected its left flank. Then fire was opened by the first and second batteries, located east of the village of Yastrebovo, and when the German vehicles came closer the remaining batteries went into action.

It seemed that the enemy knew now with whom he was dealing—he began to act carefully. Deploying into a line, his tanks moved by bounds. They stopped to fire, then suddenly made a jump ahead, then stopped again. Obviously, the enemy wanted thus to raise the efficiency of his fire without losing the tempo of the attack. But our artillery still had superiority in fire. In this skirmish, thirty-one hostile tanks, among them ten "Tigers," were destroyed by the fire of the Soviet batteries.

With the approach of darkness, the battle stopped. Beyond the line between Batratskaya Dacha—Yastrebovo, the hostile tanks failed to penetrate. The night passed rather quietly, but a concentration of German infantry west of the village of Sevryukovo was noticed. At dawn the enemy opened a strong artillery and mortar fire on our batteries, correcting it from a plane. Then followed the first raid by the enemy aircraft. Shortly, the infantry also attacked (up to a battalion). It was moving between the village of Sevryukovo and Hill 124.5, in the direction of Hill 191.8, i.e., to the flank of our batteries.

In the morning, our artillery was reinforced

by several batteries which went into position between the village of Sevryukovo and the projection of the forest on Hill 191.8. The combat formation of the unit took on a greater depth.

At noon (about ten minutes after the beginning of the infantry attack) the enemy tanks attacked. They went in exactly the same direction as before. The artillery unit which was undergoing this attack was in a difficult situation, for simultaneously with the beginning of the tank attack, one German infantry battalion began crossing the river above the village of Yastrebovo. The tank force now had not fifty, but over a hundred tanks. The enemy infantry, at the cost of great losses, succeeded in wedging into the area occupied by our artillery, and three forward batteries appeared to be encircled.

What did the commander of the unit do in this situation? He pulled back the rear batteries into the vicinity of Hill 206.9, where they occupied covered positions and opened fire on the enemy infantry (so did Pochtarev's battery which was in the reserve). The artillerymen who had been encircled were ordered to concentrate on the tanks.

The batteries were displaced so rapidly that there was no break in firing. The enemy infantry continued to press on, but its advance was paralyzed by the fire of the guns which had been transferred to Hill 206.9. The encircled batteries remained in position, tied up the enemy tanks, and did not let them pass farther. The battle lasted till dark. At night, the encircled batteries came out and occupied positions on a new line. The results of this battle were as follows: our artillerymen destroyed fifty-eight tanks and killed over 600 enemy infantrymen. In spite of the fact that the Germans used large forces, they did not succeed in advancing farther than Hill 124.5.

The next day all arms participated in the battle. The enemy tank group was completely routed and its remnants thrown far back. But still, the decisive defeat was administered to the enemy tanks by our tank destroyer unit which had to engage the large enemy tank unit all by itself, without the support of other types of troops. This is extremely significant: there is not as yet a weapon which can compete with artillery in the power of fire. Tanks are more mobile than artillery. In this case, however, the advantage of the tanks could not be exploited by the Germans. The contact with our antitank artillery was not expected by them. Furthermore, the Germans underestimated the stability of our artillery formations.

One often hears of the flexibility of German tank formations. This is true for small groups. Large masses of German tanks, however, are noticeably inert. Ordered to move in a certain direction, they usually do not turn off, or do it with extreme reluctance after encountering shattering resistance. Such was the case in the above example. This facilitates the operations of the mobile antitank reserves. As soon as the direction of the tank movement is noted, it is necessary to concentrate the antitank reserves in this direction so that the antitank reserve and the tanks will meet.

Should mobile antitank reserves organize defensive positions along some line or come out and meet the enemy? This, of course, depends upon the circumstances. Many antitank artillery commanders with ample combat experience consider mobile battles more effective. The engagement described in this article illustrates this point of view.

At the first glance, it appears that the artillery cannot compete with the tanks in maneuverability and consequently should avoid meeting engagements with them. Actually, this is not so. Experience demonstrates that mobile artillery does not yield to tanks in the speed of deployment. It is obvious that it should be deployed and prepared for action before the engagement begins. This will enable the artillery to occupy advantageous positions and to open fire first. Here, reconnaissance and march security elements are very important.

Suddenness of attack is of paramount importance. It is achieved much more easily by a rapid maneuvering of antitank units in threatened directions and by the speedy engagement of the moving enemy tanks. When the antitank units are dug in and remain

stationary for a long period of time (this is difficult to conceal from enemy reconnaissance), there is no element of surprise. Under such conditions, the enemy will naturally take all measures to suppress the antitank artillery even before the tanks approach it.

In short, the antitank artillery can and must counter every maneuver of enemy tanks with its own flexible maneuver. It is important that the appearance of the artillery along the route of the moving enemy tanks be a surprise to the enemy as to location and time. The very nature of the tank destroyer units and the missions they accomplish call for mobile warfare. This is well illustrated by the engagement described above.

Army—Air Integration

From *The Royal Air Force Quarterly* (Great Britain) March 1944.

Disclosed by General Montgomery in a talk to war correspondents on his departure from the Mediterranean to assume command of the British Army Group for the Second Front.

YOU MUST win the air battle before you fight the land or sea battle. If you examine the conduct of the campaign we fought from Alamein, through Tunisia, Sicily, and Italy, you will find that we never fought a land battle until the air battle was won. That is the first great principle of war. We (the army) never bother about the enemy air at all. The RAF fights that battle for us.

The second great principle is that army-plus-air—the 8th Army and the Desert Air Force, if you like—have to be so knitted that the two form one entity. If you do that the resultant military effort will be so great that nothing will be able to stand up against us.

The third great principle is that the RAF side of this fighting machine—the army and air are one fighting machine—must be centralized and must be under air force command.

The next principle is that the army commander directs the military effort and the RAF commander with him applies the air effort in accordance with the combined plan.

That is to say, there are not two plans, army and air, but one plan, army-plus-air, which is made by me and the air vice-marshal, and the air power is applied by the air officer commanding to fit in with the combined plan, while the army commander directs the military effort.

The army does not command the air, so the two sides, army and air, must be together in the same headquarters, and there must be complete mutual confidence and trust. Each must understand the problems and difficulties of the other.

But each side must realize the difficulties of the other. The soldier must realize that the air has certain problems—for example, that air power cannot operate without good landing grounds, and the getting of these always forms part of the army plan.

As regards the use of a striking air force in the land battle, we do use it, and have brought it to a high pitch. We started it in North Africa and we have now got to the stage where, in the Battle of the Sangro, we had a group-captain with us at official headquarters directing the fighter-bombers to targets wanting treatment at that moment.

It is a very big factor—the part of the fighter-bomber in the land battles. Accidents will happen when our own aircraft shoot up or bomb our own people. We, in the army, expect that, although we do not like it; and when it does happen, the soldier does not curse.

If you do not win the air battle first, you will probably lose the land battle.

Finally, if you can knit up the power of the army on the land and the power of the air in the sky, then nothing will stand up against you, and you will never lose a battle. I would never dream of going into battle without the Desert Air Force firmly behind me. Every soldier and airman here knows that. We are one entity.

The integration of army-air has been

closely followed by us, and you see the result. I doubt if you will find such close integration anywhere else—certainly not in the German Army. They have not got it at all—they are not even beginning to get it. Here we have brought it to a very fine pitch, and we realize we cannot fight successfully without it.

Crossing the Dnieper

Translated at the Command and General Staff School from a Russian article by Major P. Milovanov, Soviet Army, in *Krasnaya Zvezda* 17 November 1943.

THE BATTLES along the Dnieper line gave our troops a wealth of experience in crossings. The battles on those sectors of the Dnieper where the right bank was well fortified by the enemy present a special interest. Here all stages of the crossing were complex and exacted great skill of our units. In order to analyze the experience of the battles which took place in such sectors, let us turn to concrete examples.

A certain division reached the Dnieper having before them considerable forces of Germans who occupied a series of hills on the right bank. The division commander was confronted with the problem of how to organize a successful crossing under such conditions and secure the bridgehead. There was a possibility that a few rafts could be built and some boats found by nightfall in order to transfer to the opposite bank a small group of infantry and a number of guns. It was clear, however, that a small landing party would be unable to hold the right bank. In view of these considerations, the commander decided to bring up the engineer equipment. With this equipment and local materials, the main forces of the division could be moved across quickly and suddenly.

The preparation for the crossing began with a reconnaissance. The commander of the division, together with the commanders of the regiments and the chief of the engineer service, carefully investigated both banks within the boundaries of their zone. On this sector, the Dnieper was narrower near the populated place of Khodorov, situated on the right bank. Besides that, the approaches to the river on this sector were concealed by the forest. But Khodorov, as a center of the shore network of roads, was better defended. The Germans had fortified very thoroughly the outskirts of the populated place along the river. Therefore, a sector to the left of Khodorov was selected for the crossing. There is an island here in the middle of the river. It almost merges with the sand bar at the right bank. Shrubs cover the area beyond the bar and border on the small grove of oak trees adjoining the steep heights on which the German defense was situated. The shrubs and the grove provided concealment for the concentration of the units for the attack. The only defect of the sector chosen for the crossing was the deep sand on the opposite bank. But, as was found out, this condition proved to be an advantage. Later on, captured Germans testified that their command had excluded the possibility of the landing of our artillery on the deep sand of the open sand bar.

While the reconnaissance was going on, a group of sappers was directed to the nearest village to gather boats and materials for the rafts. In this village nearly thirty boats and many boards and dry logs were found. The units detailed a sufficient number of men to aid the sappers in order to deliver these materials to the place of crossing more rapidly. By morning, four rafts for heavy loads were ready and all boats were repaired.

It must be noted that right across from Khodorov the staff staged a false crossing. Here a group of fighters imitated a preparation. They hammered with their axes, came out to the bank, drew up boats to the shore, etc. This had the desired results. A German reconnaissance plane appeared. Shortly a shelling of that part of the bank began. In

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addition to this, bombers flew over and dropped their load on the empty space.

When the crossing equipment of the attached unit of sappers was brought up, several rafts were built and the boats were gathered. The chief of staff and the division engineer drew up a schedule for the crossing. In it were indicated the time and order of crossing by the regiments. In their turn, the regiments drew up the plans for the crossing of the battalions. During the first night two infantry regiments were to be moved across. The third regiment and the division artillery were scheduled to cross the following night.

The division engineer, Lieutenant Colonel Lamochkin, and the sapper officers reconnoitered the site of the crossing. The location of moorings on the opposite bank was decided upon, and a number of reference points were designated which would help in keeping on the right course at night. On each large boat and raft, the Lieutenant Colonel appointed the senior from among the sapper officers. They acted as steersmen, as it were, and had to supervise loading and unloading.

When it darkened, the demonstration of crossing began in the false sector. Here boats were launched in the water and the splashing of the oars was heard. This distracted the attention of the Germans who started to illuminate the area with rockets and intensified the shelling of the shore. By that time the unit, commanded by Lieutenant Colonel Lavrovskii, which had concentrated in the grove, began to cross over. First, the division and regimental reconnaissance units crossed to the right bank of this sector. The crossing was executed under strict camouflage. The crews of sappers on the rafts and in the boats aided the personnel in the loading and unloading of ammunition, and in drawing the guns to the sand bar of the right bank. The regimental commander was with the battalions all this time and personally directed the crossing.

The second unit crossed in the same manner. At dawn, both regiments, together with their guns, ammunition, and provisions, were already on the right bank. The crossing was so successful that the enemy discovered the concentration of our units on the right bank only when the attack began. The sudden attack of large groups of infantry supported by strong artillery fire stunned the Germans. By noon, the units of both regiments had the enemy knocked out from the heights and, advancing beyond the heights, consolidated their position. Thus the bridgehead was secured. It was large enough for the concentration and deployment of the entire division.

Junker planes appeared twice during the day, apparently trying to locate and destroy the crossing equipment, but neither from the ground nor from the air did the Germans succeed in detecting the exact location of the crossing. Long before dawn, the rafts were moved to a small lagoon where they were camouflaged in the bushes along the banks. The boats were dragged out on the shore and covered with sand. The men were withdrawn into the woods. Only the camouflaged observers remained on the shore. The enemy conducted fire during the entire day and managed to destroy only one boat.

The following night the river was crossed by another infantry regiment, an artillery regiment, and several batteries of the attached tank-destroyer unit. This time it was more difficult to cross. The Germans illuminated the river and shelled each raft and boat. Great aid during this period was rendered by our artillery and especially by the guns which were located on the left bank. They hit, by direct laying, the flashes of the enemy machine guns which were situated on both sides of the captured bridgehead. As a result of the artillery shelling, many of these machine guns were silenced. A part of the artillery was engaged in counterbattery fire.

Thus, in two nights the entire division crossed the Dnieper, the width of which in the sector of the actual crossing was up to 400 meters. The crossing was done with minimum losses. The enemy sank several boats and one raft. The two guns on one of the rafts sank also, but were salvaged the same night and put back in use.

What, then, are the conclusions to be drawn from the experience of this crossing? If the opposite bank is occupied by an enemy who has organized a strong defense, the gradual

crossing of the river, when only local materials are used to move the men and equipment, should be attempted only under favorable conditions. If the situation is not favorable, then the slow accumulation of the forces on the hostile bank will lead to undesirable consequences. The enemy will rout the crossing troops unit by unit, which in the end will break up the operation as a whole.

If it is quite clear that the opposite bank is occupied by weak enemy forces, or if the enemy is demoralized as a result of retreat, the crossing must not be delayed because of the absence of ponton equipment. The enemy will have time to reorganize and bring up his reserves. In order to prevent this, the troops should not pause at the river but cross it on the heels of the retreating enemy. Experience confirms that for the crossing of the advance guard pursuing the enemy all methods of forcing the river are good, unless the enemy has previously prepared defenses on his side of the river. In addition to boats, our units, in a number of cases, made use of small rafts made of boards, tubes from automobile tires, and logs. The first guns were taken across on primitive rafts, sometimes on empty barrels. The advance guard conquered the first meters of ground on the right shore, seized small bridgeheads, and thereby secured the crossing of the main forces.

Tank Combat

Translated and digested at the Command and General Staff School from a Spanish article by Major Manuel Gonzales Cidron in *Ejercito* (Spain) December 1943.

DURING the present war the tank has been in a constant state of evolution in accordance with the progress of the war and the changes in the theaters of operations. Its weight has been increased; its armor and armament, the power of its motor, its organs of vision and optical aiming apparatus have been perfected, and double armor plates, set at an angle for the purpose of providing maximum possible angle of incidence for antitank fire have been introduced. The tanks used in the campaigns in Poland and France were not of the same type as those which are employed at the present time in Russia and Sicily.

Tank tactics have also undergone many changes. The tactics employed in Poland and France, such as using tanks as a battering ram and in great masses which went a long distance into the enemy's territory, disorganizing his defenses and cutting his lines of communication, failed later in Russia where, because of the peculiarities of the terrain, the enemy could attack the massed tanks from the flanks, cut off their retreat, and isolate and annihilate many units.

Later on, the employment of a great number of antitank guns, artillery pieces, and obstacles, as well as dive bombers and tank-destroyer forces, checked the employment of massed tank formations.

Tank tactics had to be modified. Infantry, engineers, and artillery were provided with armored vehicles in order to follow the tanks in their rapid advance. All these arms cooperated in close and intimate contact and supported one another mutually. There was born from this common effort the modern independent armored division.

Since the principal mission of tanks is to succeed as quickly as possible in occupying their objectives and to push into the depth of the enemy's defense, seizing possession of those points which facilitate the advance of the remaining forces of the division, it is easily understood that in their incursions into the enemy's territory they should meet frequently with formations of hostile tanks and engage them in battle.

These encounters are not characterized by the brutal shock of two masses of steel, as some may believe. Combat between tanks is characterized principally by surprise and rapid decision at the moment of the encoun-

ter. All the armament must enter immediately into action and the tanks should promptly seek cover in the folds of the terrain in order to get into advantageous positions. If necessary, smoke boxes may be dropped for the purpose of escaping from the view and fire of the enemy. From these new positions the enemy tanks will be observed, and if they are superior to one's own it is best to withdraw without ceasing fire. When one's own tanks are superior to those of the enemy, a violent fire will be opened on

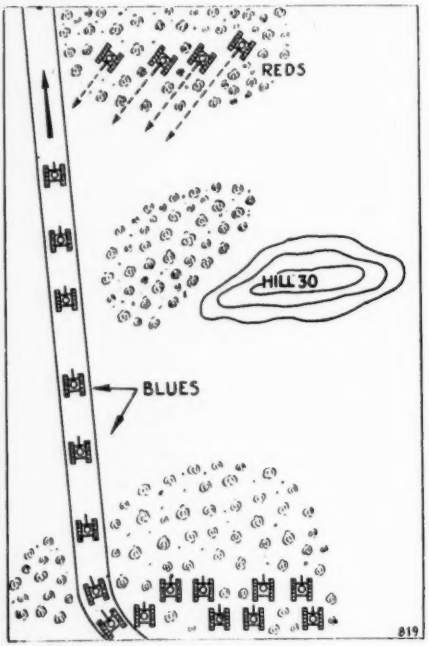

FIGURE 1.

them, and a maneuver undertaken for the purpose of surrounding them and cutting off their retreat. It must be borne in mind that every tank formation should have its flanks protected by reconnaissance cars or heavy antitank guns mounted on full-track vehicles and that the tanks which first open fire or possess the best marksmen will be the ones which achieve victory.

In the following lines, an example of a tank combat which was recently witnessed by the author in a training camp in Germany is discussed in detail.

A battalion of Mark IV tanks, which we shall call the Blue force, forms a part of the advance guard of an armored division and receives the order to accelerate the march in order quickly to reach the bridges of a canal situated some ten kilometers ahead and prevent the enemy from occupying them first. The battalion receives this order when it reaches the edge of the woods. The terrain

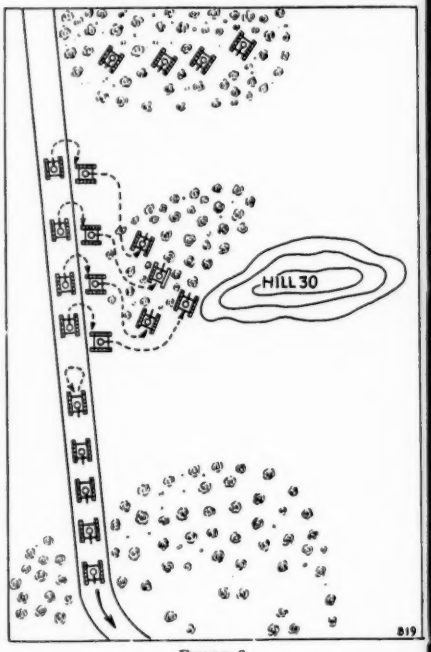

FIGURE 2.

ahead of it is quite open. From the woods there continues a highway which goes directly to the canal. On the right flank, there is a hill about thirty meters high. It is the only obstacle which merits consideration. The commander of the battalion, after carefully observing the field, decides that his unit should continue its advance over the highway in march column (Figure 1).

When the battalion has covered some three

kilometers in this manner, the advance guard is suddenly taken under fire from several enemy tanks hidden in the woods situated some 2,000 meters ahead on the right side of the highway. These tanks are supposed to be the advanced guard of an enemy formation. In the face of this sudden attack, the leading friendly tanks turn quickly off the highway to the right, seeking cover in a group of trees close to Hill 30 (Figure 2). The remainder of the tanks also turn back rapidly.

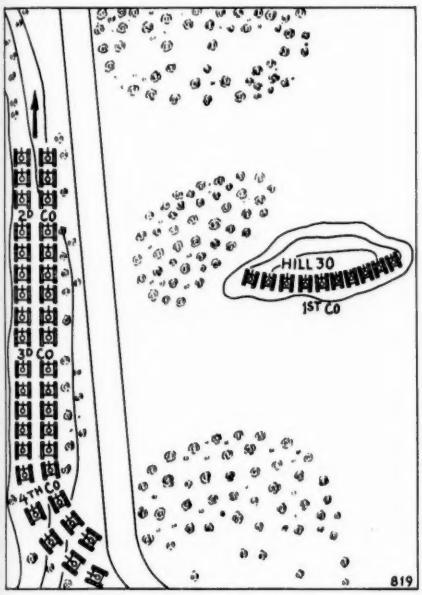

FIGURE 3.

They head again for the woods from which they started, conceal themselves, and take up positions. The battalion commander, who has directed this maneuver by radio, communicates the news by the same means to the commander of the advance guard of the division. The said commander approves this action and informs the battalion commander that, according to information received from the aviation, a great number of enemy tanks are heading for the position occupied by the battalion and that it must be prepared to attack them immediately, cutting off their advance.

The commander of the battalion studies the new situation and makes a rapid decision which he communicates to his captains: the 1st Company will take up position under the cover of Hill 30 (Figure 3), and when the first enemy tanks are in sight, will take them under fire in order to draw the enemy's attack on the company. With the battalion staff and the three remaining companies, there will be effected a wide out-flanking movement on the left of the highway, taking advantage of the tree growth and the irregularities of the terrain. The purpose of this is to place the tanks to one side of the enemy formation and to attack it at the proper moment.

On their part, the enemy command, which we shall call the Reds, with forces of the strength of about a battalion, having observed the appearance of the Blue tanks and their retreat, decides to attack rapidly, conceiving the following plan. Believing that the main line of resistance of the Blues is at Hill 30 and along the edge of the woods, it is arranged that one group of the tanks shall feint a frontal attack on Hill 30 in order to draw in this direction the fire and counterattack of the Blue tanks. The rest of the forces will effect an encircling movement around the enemy's left flank in order to attack the Blues from the rear.

For the development of the combat, see Figure 4. According to the plan as explained, the enemy tanks move out of their positions situated on the edge of the woods at a distance of 2,000 meters and make a frontal attack on Hill 30. The Blue tanks established on this hill observe their advance, slowly move above the level of the ridge with only their turrets showing and open a strong and rapid fire on the enemy tanks when the latter have approached to a distance of 1,200 meters. The Red tanks, surprised by this attack, hesitate, seek refuge in the folds of the terrain, and in their turn fire on the hill. But since the Blue tanks occupy a more advantageous position, they achieve superiority, set fire to and quickly

destroy several enemy tanks, and succeed in paralyzing the attack.

Simultaneously, from the other extremity of the woods about a battalion of the Red tanks in deep formation parallel to the highway has taken up the attack with the intention of encircling Hill 30.

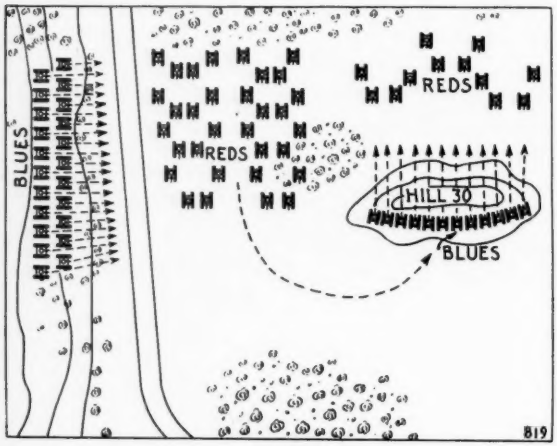

FIGURE 4.

In the meantime, the three companies of the Blue forces have completed their outflanking maneuver on the left flank and, taking advantage of the tree growth and undulations of the terrain, have taken up position alongside the enemy and are ready to attack. The commander of the battalion observes the Red tanks and notices that they have failed to protect their right flank. Since the formation is within effective range of his weapons, he decides that the favorable moment for the attack has arrived and gives by radio the order to fire. All the Blue tanks open rapid and strong fire on the enemy tanks. Immediately a great number of them are set on fire and destroyed. In the face of the unexpected attack, the Reds become confused, break their formation, seek shelter in the terrain, cast out smoke boxes in order to escape fire, and turn about continuously on their tracks so as not to present a stationary target. Some try to join the tanks which first attacked Hill 30, but the fire of the Blue forces which are established there prevents it and several of them are destroyed. Some attempt to retire from their initial positions, but the Blue tanks have advanced and cut off their retreat. The enemy formation has been decimated, and the Blue tanks pursue the few Red tanks that remain.

This example gives an idea of how a tank combat may develop, and at the same time attention is called to the great importance of keeping the flanks protected. This is the first duty of every tank commander and is the only way to avoid a surprise attack.

Mobile Detachments in Pursuit

Translated at the Command and General Staff School from a Russian article by Major V. Koroteev, Soviet Army, in *Krasnaya Zvezda* 16 October 1943.

MODERN infantry units with their comparatively large numbers of motor vehicles may in cases of necessity form small motorized detachments and throw them into pursuit of the retreating enemy. The high degree of mobility of these detachments permits them to execute a bold maneuver which secures the suddenness of blows and a rapid tempo of combat operations. The effectiveness of the operations of mobile detachments is confirmed by the fighting experience of a certain infantry unit.

Towards evening the units of comrade Utvenko, engaged in pursuit of the enemy, advanced twelve kilómeters to a densely populated place. The infantry, covering daily from ten to fifteen kilometers while engaging in combat, was very tired. Nevertheless,

it was necessary to attack the enemy at night to prevent him from withdrawing his troops and consolidating along a new intermediate line. This was a difficult problem. In case our units struck in the flank, the Germans could easily change the direction of retreat since a dense network of roads allowed them to maneuver. A sudden and violent attack was needed to cut up the enemy's front and to enable further penetration into his combat formations.

Our command decided to form three mobile detachments which were to attack the Germans at dawn. Moving in vehicles on three roads at a speed of twenty-five kilometers an hour, they were to break through to the populated place by morning and destroy the enemy forces in observation. As early as 0100, the riflemen, tommy gunners, machine gunners, sappers, and antitank riflemen were selected in the units. In the composition of the detachments were also artillery and mortars. Each detachment was given motor vehicles.

Exactly at 0300 the motorized detachments had to leave and occupy the starting position on the designated line. However, two circumstances complicated the situation. First, there was a pouring rain rendering the roads difficult for travel. Secondly, under the cover of darkness the enemy advanced somewhat and occupied the line which our command designated as the starting position of the detachments. To commence operations from the line where the units were was disadvantageous as this would complicate the possibility of a maneuver. Then, after the necessary estimate of the situation, a platoon of tommy gunners was ordered to attack suddenly and seize the hill which the enemy had occupied. Operating daringly and decisively, the tommy gunners executed this assignment, thereby establishing a base for the operations of motorized detachments.

Before daybreak the motorized detachments went out to the starting position, then moved along three almost parallel roads leading toward the populated place. The combat formation of each detachment was as follows: reconnaissance consisting of vehicles with tommy gunners and sappers moved ahead; behind the reconnaissance moved the main patrol consisting of vehicles with a platoon of tommy gunners and antitank guns (here also was the command of the detachment); finally, at a distance of 800 meters, the main forces were moving.

The right-flank detachment of Major Alyavin, having removed the German outpost on the road, broke through in fifteen minutes far forward and discovered a large column of enemy artillery and infantry. The sudden appearance of motorized detachments startled the Germans. They had become used to the idea that the force operating against them was the infantry which they saw daily. Therefore, when the reconnaissance, without opening fire, began to outflank the Germans on the right across uncultivated land, and the patrol did the same on the left, a panic occurred within the German column. Despite his numerical superiority, the enemy, caught by surprise, could not organize resistance.

As is well known, a sudden fire of artillery, mortars, and heavy machine guns is of importance during pursuit. Therefore, separate batteries and guns, and also subdivisions of heavy machine guns and mortars must boldly move out in advance and shoot up the retreating enemy. This, precisely, was what was done here. As soon as the commander of the mobile detachments noticed that the Germans started to run, he ordered a heavy machine gun set up in the cabin of the main vehicle to shoot down the running Germans while the vehicle was in motion. Soon, at the commander's signal, the entire detachment deployed, dispersed the enemy's column by fire, and at the same time enveloped his flanks.

The German artillery and machine guns which were in the rear opened a strong but disorderly counter-fire causing almost no damage to our detachment. By that time, the reconnaissance and antitank guns had gone around the flanks and, coming out in the rear of the enemy, attacked his artillery positions. The crews of the enemy guns were broken up and partly taken prisoners.

XUM

Only a small group of German artillerymen escaped by running, abandoning guns, machine guns, mortars, and other combat matériel in good condition on the battlefield.

The seizure of artillery positions, which were located ten kilometers from the populated place, to a great extent decided the outcome of the battle for this place. Notwithstanding the lagging behind of the neighbors on the left, the detachment on the right flank proceeded forward and fought its way into the settlement. The German garrison attempted to offer resistance. The motorized detachment dismounted from the vehicles and after a half hour's violent skirmish, drove the Germans from the southeast outskirts and pursued them to the northwest outskirts where a battle again developed. As a result, Alyavin's detachment alone killed over 250 Hitlerites and captured 135 soldiers and officers. Casualties of this detachment consisted only of sixteen men killed and wounded.

The second detachment, moving in the center, met resistance from the Germans near a small village. It was already dawn; the vehicles deployed, the riflemen were unloaded, and the vehicles were sent to cover. Under a sustained artillery fire from the rear, called for by the commander by radio, a detachment of tommy gunners attacked the Germans and attempted to flank them. They penetrated to the German battery in the back of the village and shot down the gun crews. Then the detachment moved ahead toward the populated place, going around small groups of the enemy.

In the meantime, the left-flank detachment, as a result of this short battle, had removed the hostile forces in observation along the road and were ahead of the others in reaching the northwest outskirts of the populated place where the Germans had posted field sentries. Our fighters dismounted and broke into the outskirts, but, encountering resistance, they stopped. To this place was brought up a considerable part of the enemy's garrison, which resulted in a favorable situation for attack from other directions. In order to beat back the blows which followed in the center and on the right, the Germans attempted to concentrate their forces again on the western edge of the populated place, but failed to carry it out in time. Our tommy gunners directed their entire fire power on the enemy and soon completely occupied the populated place, also capturing from the Germans a few self-propelled guns and tanks.

At 0800 the fight was finished. The motorized detachments inflicted on the enemy quite a heavy loss. The German casualties here were over 800 soldiers and officers killed and captured; forty-one guns, twenty-eight machine guns, and the fuel supply were abandoned.

In analyzing the work of mobile detachments in this battle, it is necessary to note the following. These detachments were able to achieve success thanks to the suddenness of their blows and the swiftness of operations. The following detail is characteristic: in the morning, at the populated place already occupied by our detachments, a German railroad hand-car arrived with sappers intending to blow up the railroad which passed here. The suddenness of the blows of our fighters saved this important objective from destruction.

The motorized detachments made complete use of their mobility. They approached the enemy on vehicles as closely as possible, dismounted, and took up combat formations. This enabled the riflemen and machine gunners to spare their strength entirely for the battle, not spending it in overcoming distance. It should be added that our riflemen had quite a substantial stock of cartridges left (two combat allotments), loaded on the vehicles. The abundance of automatic weapons and ammunition gave the detachment which came up close to the enemy a chance to bring down immediately on the Germans a destructive fire of extreme power. Combined with the great mobility of the attackers, this paralyzed the resistance of the Germans almost completely.

Not a small role in attaining the victory was also played by the skilfully executed flanking maneuvers and by the initiative and

audacious operations of the enlisted and officer personnel. Also it is necessary to notice the endurance displayed by the men—their skill in action notwithstanding the darkness, rain, and destroyed roads, and notwithstanding the fact that at times there was no communication between the detachments. The experience of this battle demonstrates that in the composition of mobile pursuit detachments it is necessary to include the bravest and most experienced fighters, to furnish them with a sufficient amount of ammunition, and to attach tanks and armored vehicles.

Airfields in War

Extracts from an article by Colonel E. St.G. Kirke, *DSO*, in *The Royal Engineers Journal* (Great Britain) March 1944.

Paramount Importance of Air Power

EVEN the most case-hardened sceptics are no longer in any doubt as to the paramount importance of the air arm in war and of the necessity for an air umbrella whether operations are being conducted by land or sea.

To give complete fighter protection, airfields are necessary every hundred miles, since a fighter's range is limited by the length of time which it can stay in the air. This at present is about two hours at cruising speed, but less than half that time when the engine is at full throttle.

Airfields are to aircraft what harbors are to ships, with this difference, that harbors can be more widely spaced, because the endurance and range of a ship at sea are much greater than those of a fighter in the air.

The primary object of airfields is to enable fighters to take off, land, be filled up with petrol, oxygen, and ammunition, while enabling their pilots to rest. For this reason runways will, in the first instance, be required for fighters (which are much lighter than bombers) and runways need not be either so long or so strongly made as they have to be for bombers.

In Tunisia it was found that runways of 1,200 yards by fifty yards wide sufficed in the first instance, and that any landing ground was better than none. Later, the width of improved surface was much increased to allow of several aircraft taking off at the same time instead of in succession, because the dust of the first aircraft taking off on a fifty yard width sometimes did not settle for ten minutes, and a squadron took over an hour to get into the air.

Selection of Site

The following decisions must be made before a search is made for sites:

a. The area in which the airfield is wanted.

b. The kind of aircraft for which the airdrome is required.

c. Number and direction of runways.

d. Whether night flying will be required.

e. Establishment of the RAF Unit, including aircraft, personnel, and vehicles.

f. The scale of ground defense and the numbers available.

g. The length of time for which the airfield is likely to be required.

e and *f* are qualified by the fact that the best available sites must usually be considered regardless of strengths for which required.

The following points are important:

a. Desirability of flat area on high ground.

b. Accessibility of communications.

c. Absence of flying obstructions.

d. Water supply.

e. Possibilities of accommodation.

If maps are not available the preliminary work can be done by air reconnaissance from 2,000 feet in the first instance, and a closer inspection of any site which appears promising can then be made from a lower height. Such sites will be marked by the pilot on air photos or compass sketches and visited later by a joint RAF and Army ground reconnaissance party.

XUM

Stereoscopic air photographs are invaluable: they show the nature of the ground, and the nature and extent of the vegetation.

Soils

Much will depend upon the nature of the soil if wet weather is anticipated, for a soil which is perfectly fit in its natural state to form a landing ground in dry weather may, and generally does, very quickly become a morass after rain, and, as such, quite unusable; in fact, *gravelly or sandy soils are the only ones which form much hope of being used in their natural state in wet weather,* unless there is thick enough vegetation to form a mat.

Black cotton soil, which occurs in many places throughout the world, is the worst of all soils under changes of weather conditions. When it dries after rain it leaves cracks which may be two feet wide and several feet deep. It should never be used if it can possibly be avoided.

The silt deposited by great rivers, and similar soils, which are so common in the East and Africa, form satisfactory landing grounds *so long as they remain dry,* and during the Abyssinian campaign no work had to be done to form landing grounds, other than the clearing of camel-thorn and low scrub, which could be done in a few hours.

During the Tunisian campaign, on the other hand, our aircraft were to a great extent grounded by mud, whereas the enemy had the use of permanent airfields built during peace.

Grass landing grounds can be used in moderately wet weather by the lighter types of aircraft, but may be dangerous through causing the aircraft to skid when brakes are applied to bring them to rest. Aircraft have been known to turn through a complete half-circle under such conditions and their pilots have only prevented them from skidding tail first into some obstruction at the end of the airfield by opening full throttle. (Steel runways are often of great value by enabling grass and other forms of vegetation to be used in wet weather. They prevent skidding and the creation of ruts.)

The bearing capacity of soils is important if they are to be used in their natural state or as a foundation for surfacing materials and a simple test can be made with a circular table about three feet in diameter having three legs, nine inches long, each with a cross section of one square inch. This table can be loaded with known weights, such as bags of cement, until it sinks suddenly, or continues to settle. The load per leg causing the sinkage gives the pressure in pounds per square inch which the soil will *not* stand, and should be divided by a factor of two, to give the load which may be applied to the soil under the runway.

Sand which is too soft for runways when dry may often be so hardened by water as to be quite usable. Thus the sea shore may be quite impossible to use above high water mark, but quite hard enough, where it has been wetted by the tide, to form a good runway. Again, sand may be laid upon mud in sufficient quantities to dry it up and make it usable in wet weather, even without steel mats.

Smoothness of surface.—As a rough guide it may be assumed that if an ordinary four wheeled saloon car can be driven over the surface at thirty miles per hour, without damage, the surface is suitable for aircraft.

Drainage

This may well prove to be an over-riding factor in selecting the site for an airfield and depends on four factors:

a. The amount of rainfall.

b. The run-off on the surface—governed by the slope of the ground.

c. The porosity of the soil.

d. The rate of evaporation—depending up on the temperature and humidity of the air

As regards *b*, the best site is one which has a steady slope in one direction, preferably across the runway. If the slope is along the runway, water channels are sure to be scoured out and the surface rendered unsafe.

A convex site is good so far as drainage is concerned, but by limiting vision may create difficulties for operational control and night flying.

A concave site is bad because water will lie in the center after rain unless the ground is sufficiently porous to soak it up.

If waterproof runways can be constructed during dry weather, subsoil drainage may not be necessary: the runways will keep the water from softening the ground underneath them if side drains are made deep enough to prevent capillarity. The maximum gradients laid down by the Air Ministry are 1/80 in a longitudinal direction and 1/40 across the airfield.

Effect of Altitude and Temperature

As altitude increases from sea level the air gets lighter, has less supporting power, and reduces the pull of the propeller. The result is that a runway has to be longer in proportion to the altitude.

Similarly, hot air is not so efficient from the flying point of view as cold air, and an addition to the normal length of runways in temperate climates may have to be given in the tropics or sub-tropics. India lays down seven percent increase per 1,000 feet of altitude, to allow for temperature and barometric pressure.

Obstructions to Flying

These may be natural, such as hills; or man-made, such as electric pylons and buildings. The general rule is that there should be no obstruction to flying within a horizontal angle of fifteen degrees splayed out at each end of the 200-yard wide cleared strip (in the center of which each runway is made) unless it is lower than a vertical slope of 1 in 50 from the end of the strip. Obstructions which infringe these limits must be removed.

Communications and Dust

There is always a great deal of traffic up to and around an airfield, particularly when the form of runway adopted involves the fetching of large quantities of materials. If good communications do not exist, it may mean that the country surrounding the airfield gets so badly cut up as to create a very difficult dust problem.

Protection

The protection of an airfield against attack involves questions of camouflage, dispersal, ground defenses, and defense from the air.

Camouflage.—It is almost impossible to deceive the camera carried by hostile reconnaissance aircraft, but it will suffice if the airfield is not readily picked out from a distance of five miles at a height of 6,000 feet, because the bomber takes time after reconnoitering the airfield to open his doors and straighten up on to the target before releasing his bombs.

There should be no well-defined natural landmarks (such as the bend of a river) or an artificial object (such as the Marble Arch in Libya) in the vicinity of an airfield.

The runways on an airfield will be most difficult to conceal owing to their length, but this does not necessarily apply to natural landing grounds.

A camouflage officer should always be asked to advise as to the best method of dealing with each particular problem, because there are many ways of making airfields blend with the surrounding country, e.g., spray-painting the runways, burning strips to represent hedges, patches to represent trees; spraying with tar or oil, or sprinkling with black cinders and other suitable substances.

Dispersal.—The most practical way of protecting aircraft from bombing attacks is to disperse them so as to minimize the effect of each explosion, and the same principle is applied generally to RAF installations and transport.

Although woods offer excellent cover from the air they can easily be set alight in dry weather by incendiary bombs, and aircraft concealed therein can be destroyed by the enemy, with the minimum of trouble. Apart from this, woods near an airfield form an obvious target, particularly if there is little sign of aircraft, dumps, etc., elsewhere.

Fighters are usually dispersed towards the leeward end of runways so as to be ready for taking off at short notice, but bombers can be dispersed up to a mile away and all around the airfield if topographical and tactical considerations allow.

Ground defense.—Aircraft on the ground can be protected to a certain extent against blast by traverses, but these take a long time to construct and are not easy to hide. The guiding principle in this and other forms of concealment is that there are no straight lines in nature, and that if such appear on air photographs they proclaim the handiwork of man. In general, airfields are likely to form the primary objective for all kinds of attack from both air and land, and their defense will form an important item in the main plan of operations.

Accommodation

Accommodation at an airfield depends entirely upon the period for which its occupation is expected and the climatic conditions prevailing at the time.

In the case of rapidly moving warfare, there may be time for little more than slit trenches, constructed by the RAF to protect the personnel from air attack, and such shelter as circumstances demand, e.g., tents. Camp structures and water supply should receive early attention.

Steel Surfaces for Runways

Where soil is not sufficiently strong by itself to support aircraft it can be strengthened by the laying of steel mats.

It can be laid on grass or on sites which have been roughly levelled and are urgently required for operational use. Ground preparation should be confined to site clearing, i.e., the felling of hedges and trees, the filling in of ditches (with suitable provision for allowing the water to pass down the original channel) and minor levelling of ridges and depressions.

This netting will unfortunately not enable the ground to be used if it gets thoroughly wet, as it merely gets driven into the mud and ceases to be of practical value. Some sort of herbage is essential for it to be laid upon in wet weather. Sometimes rushes, sand, etc., may meet the case but in Tunisia neither this nor any other form of steel mat was successful, because wet mud got to the surface and completely blinded the pilots of all but the first aircraft when taking off or landing.

In short, no steel runway will overcome mud, unless the mud can be kept from rising by an almost unlimited number of tarpaulins, or overlaid with a sufficient depth of sand to soak up the moisture and consolidate the surface.

Advanced Landing Grounds

As stated above, experience in this war has shown that fighter airfields sited well forward are essential to an army fighting against a first-class enemy. These advanced landing grounds may be required in places not served by roads, such as high plateaus, frozen lakes, or airfields on islands—in the Pacific, for example.

If such airfields are to be made quickly and *if speed is vital*, labor, mechanical equipment, and stores must be carried by air. Specially trained airborne engineers are also required for the purpose, and they can, to a great extent, be dropped by parachute.

The work involved in one of these rapidly made fighter airfields can be divided into two phases:

Phase I

(i) Levelling and marking of landing strips, 1,200 yards long by fifty yards wide.

(ii) Clearance of approaches.

(iii) Consolidation of soft spots.

Phase II

(i) Laying runways or parts of runways with metal track.

(ii) Making taxi tracks and possible dispersed aircraft standings.

(iii) Light antiaircraft defense.

(iv) Provision for RAF personnel servicing and maintenance stores.

The above form the minimum requirements of a fighter airfield, such as can be made through the agency of air transport.

More Permanent Airfields

Although in the first instance it may suffice to make landing grounds for the lighter types of aircraft, it is almost certain that they will be ultimately required for the heavier types, if only for purposes of supply, except in countries which are well provided with surfaced roads.

As one of the most important features of

warfare is the adequacy of transport, airborne transport will almost certainly be used sooner or later.

Soil-stabilization and mix-in-place.—The only forms of semi-permanent runway which afford any prospect of being made in a short time are those which are made from mixing the natural surface of the ground with some bituminous binding material or cement, because the only material which has to be brought to site is the binder itself. Granular soils are the most suitable for this process, but ordinary agricultural soils have been successfully treated under favorable conditions.

Runways made from concrete or similar substances require the aggregate to be brought to site, involving the provision and transport of enormous quantities of material. This type of construction is therefore not suitable for mobile warfare except for heavy bombers, the distance of whose airfields from the front line is not so important as in the case of fighters.

Repair and Maintenance of Airfields

Airfields may be put out of action by aerial bombing, or as the result of deliberate demolition. In either event, to make the airfield usable the aim should be to get a landing lane freed from obstructions as soon as possible.

If the damage has been caused by aerial bombing, a reconnaissance aircraft should be flown over to see where a landing lane can most easily be re-established, facing into the wind blowing at the time. This reconnaissance should be done in the presence of engineers so that no time is wasted in getting work started. Ranging rods or flags to mark the center line of the landing lane should be set out, preferably by the RAF.

The filling of craters follows the recognized method of filling shell holes and can best be done by mechanical means.

Machinery and tools for repair.—It will seldom be possible to have the necessary apparatus available at each airfield owing to the supply position, and for this reason central depots will generally be established where plant, etc., can be stored ready for an emergency, to serve airfields within a radius of twenty miles. Mechanical earth-movers such as bulldozers, dumpers, blade-graders, scrapers, power-driven rammers, will all speed the work and call must be made on all the personnel within reach, of every service or arm, to make good the damage as soon as possible by all available means.

Destruction of Airfields

Circumstances may arise under which airfields have to be put out of action. This is done by displacing as much earth on the runways in as many places as possible with the time and explosives available, and in such positions that the filling of a few craters would not make the runways fit for use.

A simple way of doing this is to use earth augers, with the idea of exploding camouflets, and, as a rough guide, two pounds of ammonal for each running yard of runway or taxi track are required. Unsurfaced airfields can readily be put out of action by ploughing them up, and this method was much used by the Germans when they were being bundled out of North Africa.

The destruction of runways by bombing cannot normally produce good results even with ten times the amount of explosives used for demolition on the ground, and the Germans never put any airfield in England out of use for long, even when they had most of the sky to themselves.

Conclusion

A fitting conclusion to this article may be found in the words of a senior Royal Engineer officer writing from one of the battle-fronts:

"The big lesson I am learning here is the magnitude and urgency of the airfield problem . . ."

"We can never have enough mechanical equipment, the demands are enormous . . ."

"Everything we do is limited by the transport problem . . ."

"I feel that all CRE's [Commanders, Royal Engineers] Works must be taught to under-

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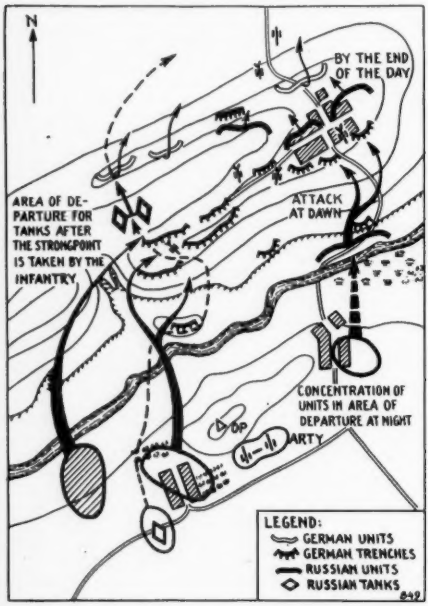
stand that the maintenance of airfields and immediate repair work after air attack is their primary commitment in theaters of operations."

Cooperation Between Infantry and Tanks

Translated at the Command and General Staff School from a Russian article by Guards Colonel N. Slavyanov, Soviet Army, in *Krasnaya Zvezda* 19 January 1944.

THE SUCCESS of cooperation of various arms depends upon many factors, among which the terrain is one of the most important. Therefore, in planning an attack and including in it a certain idea of cooperation, the commander should first of all make a thorough study of the terrain.



It is well known that in attacking the forward edge of defense the tanks usually advance first. The infantry follows them and tries to break into the enemy positions. Is this combat formation always justified by the situation? Certainly not always. Not infrequently, the situation requires a different formation. Thus, on broken terrain characterized by woods, marshes, and steep and rocky hills, it is sometimes necessary to attack the enemy without the participation of tanks. In such cases the infantry clears the way for the tanks. Supported by the artillery, it breaks through the forward edge, and the tanks follow it. It also happens that the infantry is sometimes forced to fight without the tanks, even within the defensive zone of the enemy, in order to use them later as a shock force.

To illustrate the above, let us cite the following example. On a southern sector of the front our units had reached a small stream (see sketch), which was not really an obstacle as it could be forded everywhere. A serious obstacle was the opposite steep bank where the first line of German trenches was located. The second line was on a commanding height, which the Germans had transformed into a strongpoint, making use of a large village for the purpose. There was a road which ran through the village, and then almost directly to the north towards a large railroad center. The Germans had built their defenses in this sector because it enabled them to defend this important road and protect it from tank attacks.

Such was the situation when the commander of one of the infantry regiments decided to break through the German defense, using the tanks ahead of the infantry—with artillery support, of course. His decision was based on the assumption that the tanks, having breached the forward edge of defense, would break into the enemy positions without halting. But in making this decision the terrain had not been taken into account. Poor reconnaissance was the reason for it. The tanks did not have enough room to deploy.

The attack failed, and the commander withdrew the tanks. After an extensive recon-

naissance carried out by our infantry detachments, a new plan was conceived. It was based on taking full advantage of the terrain. The opposite bank had a number of deep ravines. The reconnaissance had established that one of them led out to the flank of the advance German position. The commander decided to make use of this ravine. At night, one of the battalions crossed the stream, overcame the German advance guard of submachine gunners, and went into the ravine. From here the units of the battalion delivered a flank attack. It is interesting to mention how mortars were used in this maneuver. All mortars of the regiment concentrated their fire on the forward trenches of the enemy till a signal from the units which were accomplishing a turning movement indicated that they had reached their objective. During this period the artillery was suppressing the German fire positions on the height and in the village.

Toward dawn our unit was in possession of the first line of trenches, and of the second line which was on the commanding height. By this time the neighboring unit on the right had captured the southeastern half of the village. Our third unit also made use of a ravine and, upon capturing the height on the opposite bank of the river, helped in the advance of the first echelon. By the end of the day, the enemy positions on both heights and also the populated place were in our hands. This was the time to use the tanks. Moving behind the attacking units they concentrated near the second height and then accomplished a deep turning movement from the left inasmuch as to the right of the road the enemy still had in his possession strong antitank positions. This maneuver was carried out after the center of resistance had been practically overcome and the Germans were retreating to the large railroad center.

In war, even little things which appear insignificant at first sight may radically change the situation. In the above example the ravine was responsible for the success of the second attack. Nobody paid any attention to the ravine at first, but a thorough study of its location enabled the commander to conceive a plan which led to the breaching of the defense position in his sector. In this plan, the tanks went into battle last, and the events that followed fully justified this form of cooperation: it was designed to take full advantage of the terrain.

Night Photography from the Air

From *The Royal Air Force Quarterly* (Great Britain) March 1944.

NIGHT photography has played a very important part in making possible Bomber Command's saturation attacks on Germany's industrial cities. Every advance in modern bombing tactics, every improvement in Pathfinder technique, has involved the study of many hundreds of night photographs, taken in the very act of bombing. They provide indisputable and scientific evidence, almost immediately after each attack, not only of the probable results of bombing but of much else that will be of great assistance in the planning of future attacks.

Night photography is now a completely automatic process. The camera is put into every aircraft of Bomber Command before it makes an operational flight. A member of the photographic section of the ground staff sets the controls of the camera and adjusts them according to the height from which the aircraft is to bomb. The armorer—also a member of the ground staff—installs the photo flash, a magnesium flash-bomb which will explode above the target and illuminate it just before the bombs hit; and from then on until landing-time no one in the crew need concern himself with the camera, except for one moment when a warning light shines in front of the pilot to show him that the photographs are being taken.

Everything happens automatically when the bomb-aimer presses the bomb firing key.

The bomber returns with an automatic record of the area within which the bombs fell, together with much other useful information about the extent of the fires on the target at this stage of the attack, about what evasive action was taken by the pilot, and on occasion about the enemy's decoy fires, the operation of the Pathfinders' target indicators, searchlight concentrations, flak battery positions, and very occasionally some preliminary bomb-damage assessment.

Night photography has been continuously developed to its present stage of efficiency since it was first used on operations in 1940—the first successful operational night photograph was of a railway yard bombed during the Battle of France on the night of 31 May, 1940.

The principle of air photography by night is simple in itself, and all that is required is to synchronize, by one means or another, the opening of the camera with the explosion of magnesium flash dropped by the aircraft. This synchronization is effected in the simplest fashion, by leaving the camera shutter open for a few seconds before and after the explosion of the flash, which lasts for about a thirtieth of a second. But the RAF had a much harder problem to solve in 1940; a method had to be devised of taking night photographs at operational heights, which might be well over 20,000 feet, and under operational conditions, with the whole crew busy and usually at the tensest moment of the attack. It has taken much experiment and ingenuity to make the process as automatic and the photographs as clear as they are today.

The flash-bomb is in itself an ingenious piece of mechanism. It looks like a small bomb, about three feet long and four and a half inches in diameter. It is ingeniously fused to explode at about half the height at which the aircraft is flying. Its tail, rather smaller than that of the normal bomb in relation to its size, is contrived to make the flash trail farther behind the aircraft than would an ordinary bomb; this is so that the flash will not explode directly below the aircraft but at a sufficient distance behind it to illuminate, without being actually within, the camera's field of view. The first flashes only developed three or four million candle-power; nowadays, although this is difficult to measure within a million or so, the flash develops, at the peak of its intensity, some 170,000,000 candle-power.

The vital photograph is that taken when the flash goes off, because this is calculated to be the moment when the bomb, falling faster than the flash, is just about to hit the target. This essential photograph is called "the bombing frame." Because the flash only lasts for a thirtieth of a second, and the camera shutter is open for a second or two before and after this, the film will show an instantaneous photograph of the ground superimposed on a photographic record of any source of light on the ground, such as fires, gun flashes, or searchlights.

As the aircraft is moving while the film is exposed, a spot of light naturally comes out as a streak across the film, and if the aircraft has been taking violent evasive action this streak may be curved or looped. Only a trained interpreter can make any sense of the apparently inexplicable marks which are made in this way, but to him they reveal a great deal. Almost any source of light on the ground will be recorded; an ordinary electric light would show up plainly at 20,000 feet.

Before and after the bombing frame is made the camera also takes other photographs; the film automatically winds over and the shutter is automatically opened and closed several times while the aircraft is over the target. Fires, bomb bursts, decoy fires, gun flashes, and much other useful material may be recorded on earlier or later frames, though there is naturally no ground detail without a flash, except when the ground is lit up by the flash from another aircraft.

There is one important limitation to night photography; it is obviously impossible to get any view of the ground when an attack is being made through ten-tenths cloud.

A very few hours after all the aircraft have landed the plotters get to work on the photographs. Theirs is a highly skilled job; often they have to determine the position of

the area photographed from the smallest indication—a glimpse of a street, or the curve of a river only illuminated over a very small area. But such indications are quite enough for them to find the exact position of the area by comparing it with a map or a mosaic photograph. The plotters make their first report on the success of the attack to the Commander in Chief of Bomber Command, and the decision whether or not to attack the same target again may depend on their report. Later they produce a map on which all the areas plotted are marked in relation to the aiming point on the target. Such a map usually gives a precise indication of the success or otherwise of an attack and is also of the greatest value in planning tactics for the future.

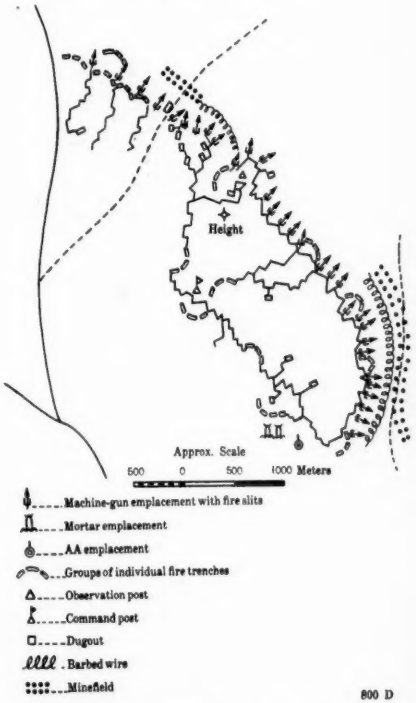
German-Rumanian Field Fortifications Northwest of Stalingrad

Translated for the Command and General Staff School from a Russian article by Colonel I. Gnedowskii and Senior Combat-Engineer P. Spivak in *Voyenno-Inzhenernyi Zhurnal* (Military Engineer Journal) February-March 1943.

DURING a successful advance of our troops northwest of Stalingrad, our unit captured an enemy defense zone in one of the sectors of the front. The enemy had established there his forward defense line with the idea of utilizing the deep gullies and ravines situated in front of his line as excellent natural antitank obstacles. The approaches and outlets of the gullies were well covered by forward firing positions.

The defense zone consisted of a network of reinforced company and platoon strongpoints established on dominating heights. They straddled roads and inhabited places and were located at a distance of two to four kilometers from each other. The intervals between the strongpoints contained infantry entrenchments and machine-gun emplacements connected by communication trenches and machine-gun positions nearby. The distance between the machine-gun emplacements of the forward defense line did not exceed a hundred meters. The approaches to the first line of trenches, which were open to tank attack, were protected by antitank-gun positions.

The strongpoints of this network of fortifications were connected by a well developed system of passages with infantry trenches, machine-gun, mortar, and antitank-gun emplacements, as well as with personnel shelters such as dugouts, individual fire trenches, and lit trenches (see sketch).



Approaches of special tactical importance were protected by reinforced platoon strongpoints built on the outpost line.

Certain of the ravines with gentle slopes

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were utilized as fire pockets in the system of defense. They were well covered by oblique fire from the nearest strongpoints of the forward line.

Artillery positions were located behind natural obstacles, from two and a half to three kilometers from the forward line. They had concealed roads, usually running through gullies, to bring up ammunition. Personnel shelters and ammunition dumps were built on the back slopes of gullies and ravines.

Command posts were located on back slopes of gullies. They consisted of widely separated dugouts or shelters with overhead cover.

All artillery and mortar positions, as well as observation and command posts, were protected by infantry trenches reinforced by machine-gun emplacements.

Dwellings and other buildings in inhabited localities were hardly used in this defense system, probably because they were largely demolished.

These fortifications erected by the enemy are typical of those employed in treeless areas and steppes. The backbone of this defense is a full-depth open trench with a system of communication passages, slit trenches, niches, and dugouts. In the main sectors, trenches and communication passages are excavated to full depth, but in the secondary sectors they are cut to a depth of from 0.6 to 1.4 meters. Moreover, the enemy utilized quite extensively emplacements with overhead cover and triple embrasures, and earth-and-timber pillboxes with one light or one heavy machine gun each.

It should be noted that there is a great variety in the planning of installations and in the execution of details.

The bulk of the fire power is placed w forward and is linked with the seco and third defense lines by communicati passages. Firing positions located on ro and in places exposed to tank attacks are p vided with many slit trenches for personn

Shelters below the parapets for single fantrymen and for mortar and machine-g crews are frequently constructed in the imm diate vicinity of firing positions. They prov the simplest form of protection from fire, well as from rain, snow, etc.

Obstacles are constructed along the m dangerous approaches in front of the f line of defense. These approaches coincide, most cases, with roads running in and out the ravines which are perpendicular to front and extend into the depth of the defe system.

Antipersonnel barbed-wire entanglemen are erected in the form of reinforced fenc wire-nets on pickets, chevaux-de-frise, a concertinas.

Antitank obstacles consist of minefiel laid on roads and in gullies. The system laying mines varies. Sometimes the mines a laid in rows, three meters apart; the rows a spaced from two to three meters. The numb of such rows usually does not exceed six. T depth of minefields is, in most cases, fro twenty to twenty-five meters. Some minefiel are as long as one and a half kilometers.

The defense employed by the Rumani Army and described above is obviously orga ized on the pattern of German defense sy tems. The entire construction was carried o under the direction of German officers.

The Unknown Leader—that is the good company, platoon, or section leader who carries his men forward or holds his post and often falls unknown. It is these who in the end do most to win wars.

—Field Marshal Wavell.

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